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Commodore MAGAZINE

RUN

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May/June 1991
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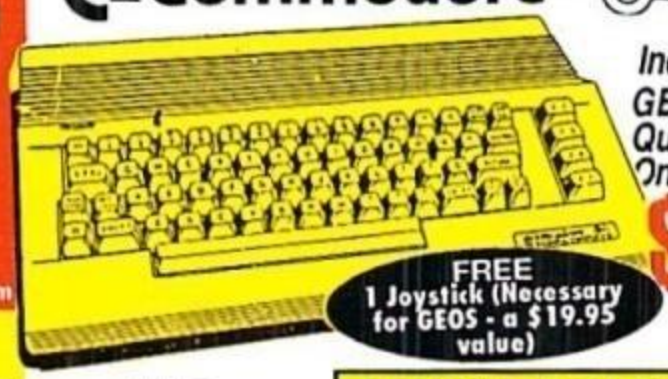

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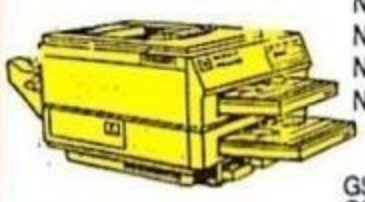

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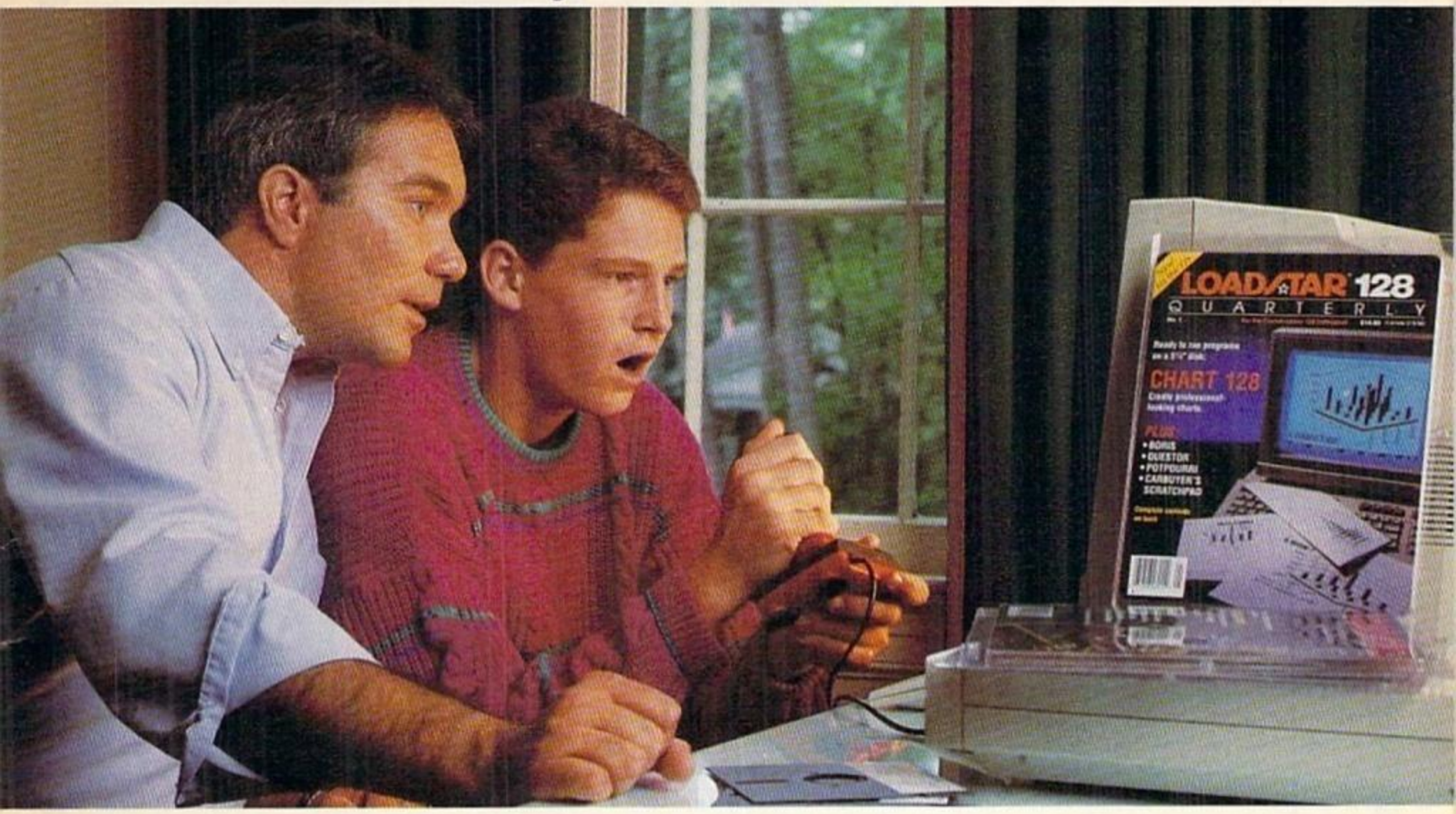

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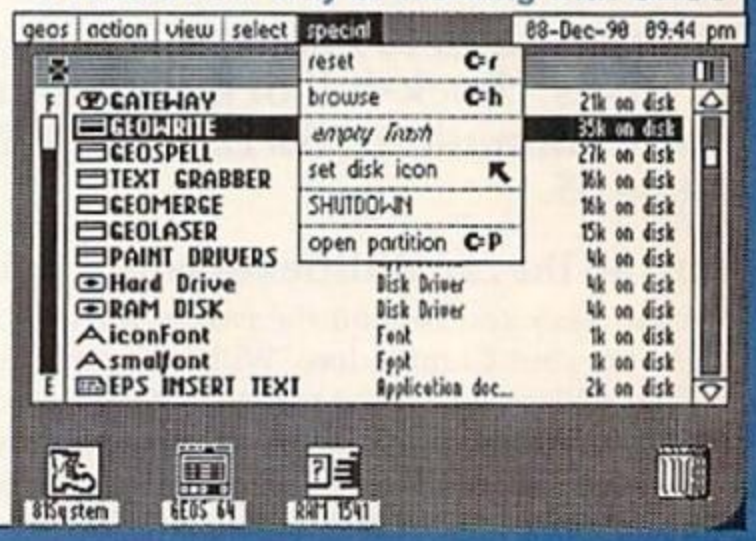

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- RAM disk drivers allow use of as much available RAM as possible - no longer limiting you to a 1541 or 1571 sized RAM disk.
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SWIFTLink-232 Cartridge $39.95 SWIFTLink Cable $9.95

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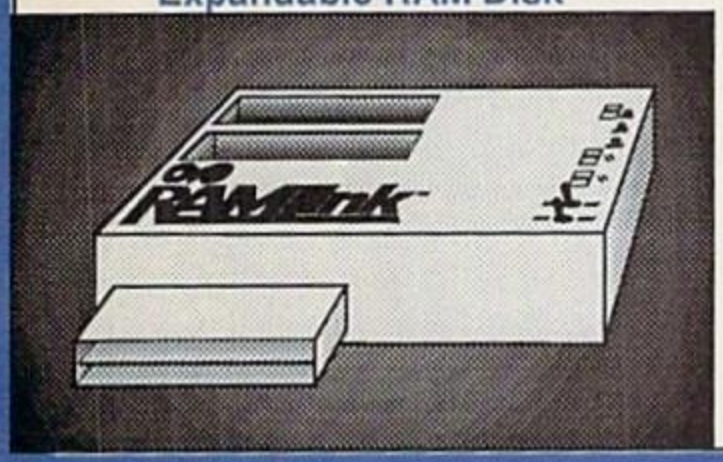

RAMLink is a multi-purpose hardware interface designed to overcome the limitations of existing RAM expansion units (REU's). RAMLink delivers the performance and compatibility lacking in past REU's by incorporating CMD's proprietary RL-DOS and advanced features into a compact unit which allows most software to utilize Commodore 1700 series REU's, GEORAM, PPI's RAMDrive, and CMD's RAMCard as if it were a disk drive. Optional RAMCard installs internally and can be used alone or in combination with the storage of an external REU for a maximum capacity of 16 Megabytes.

- Supports Commodore 1700, 1764, 1750, Berkeley Softworks GEORAM and PPI's RAMDrive.
- Optional RAMCard allows RAMLink to be used as a RAM Disk with or without a separate REU. User Expandable from 1 Mb to 16 Mb using standard SIMMs.
- Pass-Thru connector allows use of cartridge port peripherals such as utility cartridges.
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- RAM port provides power back-up to REU's.
- Parallel port provides ultra-fast data transfer when connected to CMD HD series hard drives.
- Includes separate power supply - optional battery available to protect against power failure.

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Both RAMLink and RAMDrive Include RL-DOS

- Allows commercial software to access all available RAM as a high-performance RAM Disk.
- gateWay software for GEOS use available at no additional charge.
- RL DOS performs up to 20 times faster than Commodore RAMDOS, up to 400 times faster than a stock 1541 and provides full DOS command compatibility.
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- Includes built-in JiffyDOS Kernal for high-speed access to JiffyDOS equipped disk drives.
- Software for copying files (FCOPY) and complete disks (MCOPY) included.
- Many other features, including CMD's exclusive device number SWAP functions.

RAMLink or RAMDrive - Which one is right for you?

Both RAMLink and RAMDrive give Commodore users powerful features never before available in a RAM expander. RAMDrive is intended mainly for those who do not require the high RAM capacity of RAMLink (up to 16 Mb), RAMLink's Pass-Thru port or the parallel port for communicating with the CMD HD Series of hard drives. RAMDrive is an excellent choice for those who desire portability since the internal battery pack can keep the contents of RAMDrive intact for several days. RAMLink is the perfect choice for GEORAM owners who want the ability to use that device with programs other than GEOS. RAMLink has a built-in RAM Port for easy use with a GEORAM or Commodore REU. No matter which CMD RAM device you select, you'll benefit from the fantastic capabilities of a high speed RAM disk equipped with RL-DOS and the outstanding value of CMD support.

RAMDrive - A High Performance Battery Backed RAM Cartridge

RAMDrive is a fresh new approach to RAM expansion for the Commodore 64 and 128. RAMDrive is a self contained battery backed cartridge with capacities of 512K, 1 Mb and 2 Mb. RAMDrive incorporates RL-DOS, an ultra-fast, easy-to-use operating system similar to the HD-DOS found in CMD HD Series hard drives. This DOS allows various types of partitioning along with compatibility and speed unsurpassed by previous RAM Expansion systems.

- Compatible with vast amounts of commercial software as an ultra-fast RAM disk.
- Power back-up eliminates the loss of files upon powering down the computer while the built-in battery protects data during transportation or power outages.
- Available in 512K, 1 Mb and 2 Mb models at incredibly low prices.
- DOS includes JiffyDOS Kernal routines for high speed disk access with JiffyDOS equipped disk drives.
- Software for copying and GEOS compatibility included.
- Reset switch allows computer reset without loosing data in RAMDrive.
- Reset, Disable and SWAP functions are all standard features.

RAMDrive w/512K $149.95 **RAMDrive w/1 Mb $199.95** **RAMDrive w/2 Mb $289.95**

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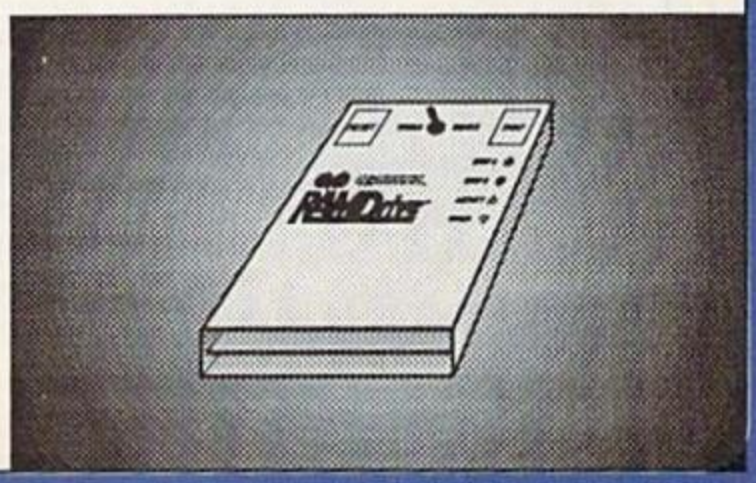

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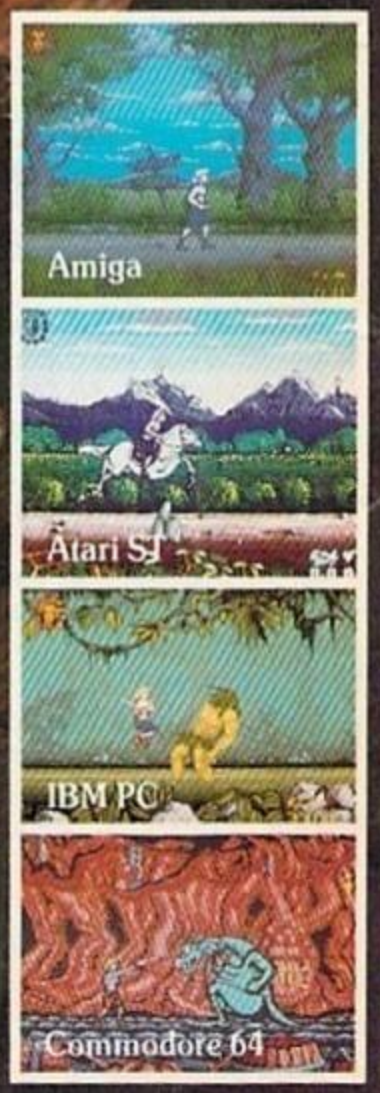

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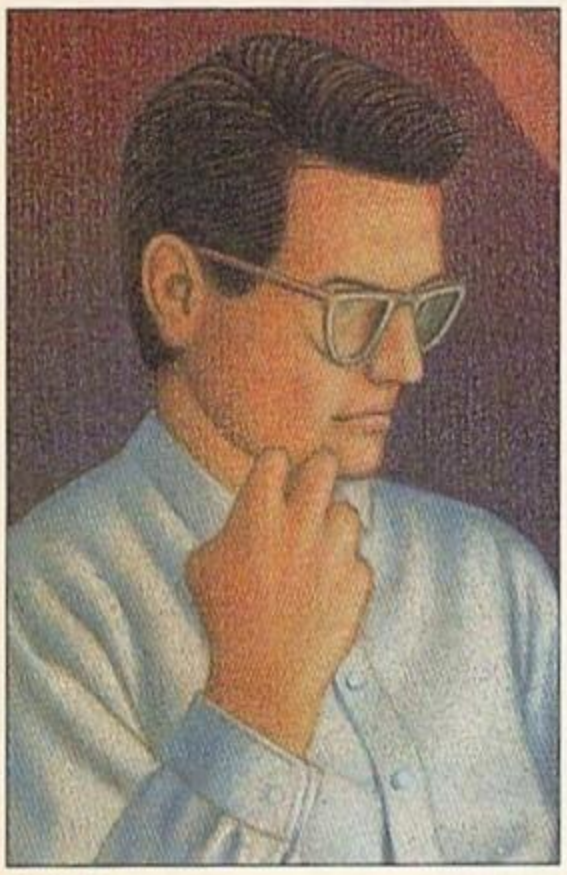

PAGE 20

PAGE 26

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FEATURES

*20 **"It Was a Dark and Stormy Night . . ."** *by Mark Jordan*
Write that book you've always wanted to, then enter it in *RUN*'s contest.

*26 **Scaling Metric** *by Jeff Koester*
Conquer the metric system with this quick conversion program.

*28 **Bomb Squad** *by Robert Cook*
You've got to be quick to beat the maze and collect the keys in this explosive game.

*32 **On Your Mark!** *by Ward Shrake*
Find the slowpokes in your Basic programs with time-analyzer program.

User's Group List *by The Fans Of 8-Bit Computing*
By popular demand! We've had so many requests for this revised list that we just had to publish it. Find the handy pull-out reference card between pages 32 and 33.

DEPARTMENTS

6 **RUNning Ruminations** *by Dennis Brisson*
Commodore users face the dudes with black hats.

8 **Magic** *compiled by Tim Walsh*
Animate your C-64, scratch by filetype and learn the secrets of the "Cs."

10 **News and New Products** *by Janice Greaves*
CES in Las Vegas has once again brought out the best in C-64 entertainment software.

12 **Mail RUN**
Origin Systems, user's groups and Norman Rockwell are on deck this month.

14 **Software Gallery** *Reviews of:*
- Where in Time Is Carmen Sandiego?
- Goofy's Railway Express/ Donald's Alphabet Chase/ Mickey's Runaway Zoo
- Duck Tales: The Quest for Gold
- Beetlejuice, Gremlins II, Flintstones & Jetsons Print Kits
- Word Writer 5
- The Keys to Maramon
- MicroLeague Football
- Teenage Mutant Ninja Turtles
- Buck Rogers: Countdown to Doomsday
- Artura
- The Notable Phantom
- Crypto Cube

36 **Hardware Gallery** *by John Ryan*
See reviews of Super Snapshot V.5, Turbo Master, a fancy joystick stand and a detachable keyboard for the C-64.

40 **ProTips** *compiled by Janice Greaves*
Tips for Basic and the 1581, plus our usual supply of GEOS and word processing info.

44 **geoWatch** *by Gerry Descoteaux*
Dig into this treasure chest of GEOS accessory programs.

45 **More geoGems** *by Stéphane Dirschauer*
Accessories and auto-exec gems that will make your computing life more rewarding.

47 **Q-Link Downloading Tips** *by Gerry Descoteaux*
Simple steps for retrieving programs and info from this popular online network.

*50 **128 Mode** *by Mark Jordan*
A new angle on smart weapons. Boy, would Mark's high school trig teacher be proud!

58 **Gold Mine** *compiled by Louis F. Sander*
Big scoring strategies for Buck Rogers, Red Storm Rising, Ultima VI and more!

59 **RUN Amok**
OK, we admit it, we're not perfect. Here's the proof: corrections to our last issue.

60 **Commodore Clinic** *by Ellen Rule*
Transfer files to MS-DOS, upgrade your video RAM, find Pascal, and more.

61 **RUN's Checksum Program**
Run it right the *first* time.

64 **Coming Attractions; List of Advertisers**

*** If you'd rather be out flying kites than typing in programs, order them (the programs that is, not the kites) on the May/June ReRUN disk. Just call 800-343-0728.**

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RUNning Ruminations

WANTED: Products for the Commodore

Sometimes Commodore computerists must feel like Gary Cooper in *High Noon*: alone on the street, facing the dudes in the black hats.

Despite the odds, enthusiasts persist in a market that has declined dramatically in recent years. Some frustrated folks simply "packed it up" and headed for MS-DOS or Amiga country. For the majority of us, however, who have invested much time, effort and expense in our systems, we're satisfied to continue with our Commodore computers, which have served us well in the past and are meeting our current needs. But, for how long? The lack of products in this market has many readers we've talked to recently wondering.

Software developers we met at the recent Consumer Electronics Show strongly suggested that more software would be available and more development would be occurring for the Commodore if retailers weren't cutting back or eliminating the shelf space allotted to Commodore products.

More products would be available if retailers weren't cutting back shelf space.

"It's like a self-fulfilling prophecy," noted one programmer for a major software manufacturer. "If users can't see our products to buy in the stores, then there's no incentive to produce for that format, and this affects all of us in the market."

Products that were once plentiful at local stores are now as hard to come by as a nickel mug of sarsaparilla. Commodore users—especially those new to the market—should keep in mind that Commodore products are available. In fact, those innovative manufacturers who remain in this market are currently reaping the benefits, and even experiencing difficulty keeping up with demand. Finding hardware and software in this market takes a little persistence, but it can be done. Here's how:

First, check out the ads in *RUN*. Many companies exist to serve this market. For some peripherals, such as 1581 disk drives, your name may be placed on a waiting list. Call these manufacturers—many of whom have toll-free 800 numbers—directly. Show them your support. Most of these businesspeople are still good practicing capitalists and are reluctant to turn a deaf ear to eager, paying customers.

Second, call Commodore's Express Number (800-448-9987) to find a retail store near you that's still carrying Commodore products.

Third, we've said it many times, but it bears repeating: Stay in touch with users—either online or via user's groups.

We at *RUN* never could have foreseen that we would one day be in the mail-order business, but it's true. Realizing the lack of availability of products, *RUN* has arranged to purchase some Commodore equipment—power supplies, modems, REUs, even 128Ds—and is offering these items at bargain prices. Check out our catalog and ads in this issue.

By tapping these resources and enlisting the aid of other users, we can keep this industry prosperous and productive. As in the old Western movies, this story can have a happy ending.

Dennis Brisson

Dennis Brisson
Editor-in-Chief

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printer Intfce Super-G	40
Printer Intfce Super Graphic Junior	42
Printer Intfce Super Graphic Senior	59
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Quick Brown Box 256K	189
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Ribbons	call
Ribbon Renew - Re-Ink w/no Equip	5
Super Explode	39
Super Explode w/disable	47
Video RAM 64K Daughterboard	50

BOOKS

1541 Troubleshoot & Repair Guide	17
1571 Internals+	17
500 C128 Questions & Answers	15
C128 Troubleshooting & Repair	17
CSM Prog Protection Manual 1	24
CSM Prog Protection Manual 2	29
GEOS Tips & Tricks+	15
K Jax Revealed Trilogy	32
Lou Sanders Tricks & Tips	16
Twin Cities 128 Compendium #1	15

GENERAL BUSINESS

CMS Accounting/128	129
CMS Inventory Module 128	53
Data Manager 64	17
Fleet System 4	52
Fontmaster 128 w/Speller	30
Fontmaster II/64	29
KFS Accountant 128	109
Leroy's Label Maker	24
Paperclip 3	39
Paperclip Publisher	14
Partner 128	33
Pocket Dictionary 64/128	10
Pocket Filer 2	29
Pocket Planner 2	25
Pocket Superpak 2 (Digital)	67
Pocket Writer 3	46
Sideways 64/128	17
Swiftcalc 128 w/sideways	33
Swiftcalc 64 w/Sideways	17
Technical Analysis System 64	29
Word Writer 3/128	33
Word Writer 5/64	30
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Write Stuff 64 w/spellchecker	22
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Clue: Master Detective	22
Crackdown	17
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F/16 Combat Pilot	24
Games Collection (Epyx)	23
Golden Ax	17
Grave Yardage	17
Hole In One - Miniature Golf	20
Iron Lord	27
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Keys to Maramon	20
Kings Bounty	27
Knights of Legend	33
Land, Sea, Air (Microprose)	33
Loopz*	**21**
Marvel Trilogy	30
MicroLeague Baseball II	27
Medieval Lords*	**41**
Monday Night Football	26
Myth*	**21**
Night Breed*	**21**
Night Shift*	**21**
Omega	33
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Ultima Trilogy (1,2,3)	39
Ultima V	39
Ultima VI: False Prophet	**46**
Untouchables	21
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MAGIC

Presto! Character animation for the C-64, using a 1541 with a 128D, and saving your C-64 screens to disk.

Compiled by TIM WALSH

$5C0 1541 ON THE 128D

If you've stopped using your 1541 since upgrading to a C-128D, you can dig it out of the closet and start using it once again. My program, 1541 on the 128D, cures the incompatibility problems faced by C-128D users because of the 1541's lack of DIP switches to set the device number to 9 or higher. Just connect your 1541 to the C-128D, then load and run my program. You'll then be able to run software that requires the 1541, such as copy-protected games, and use 1541 disk utility cartridges, such as the Epyx Fast Load.

```
Ø  REM USE A 1541 WITH 128D - TIMOTHY HERD
                                          :REM*2Ø3
1Ø OPEN15,8,15                            :REM*126
2Ø PRINT#15,"M-W"CHR$(119)CHR$(Ø)CHR$(2)CHR$(9+
   32)CHR$(9+64)                          :REM*2Ø5
3Ø CLOSE15                                :REM*19Ø
```

TIMOTHY HERD
CLAREMORE, OK

$5C1 AUTO-ANIMATE 64

Auto-Animate keeps the C-64 in step with the times by providing character animation. Running Auto-Animate 64 sets the @ key into animation by rapidly redefining it. You can adjust the animation speed by changing the value of memory location 49182 using the syntax POKE 48182, X, where X is a value from 0 (fastest) to 255 (slowest).

To add more animation, add 8 to the value 48 in memory location 49262 for each additional frame. The program also gives you the option of using custom character sets.

Because this routine is interrupt-driven, it makes a perfect companion to Basic programs. Just incorporate Auto-Animate as a routine into your programs and activate it with SYS 49152.

```
Ø REM ANIMATION 64 — STEVEN BOND          :REM*1Ø1
1Ø CK=Ø:PRINT"USE A CUSTOM CHARACTER SET":INPUT
   "AT LOC. 1228Ø";A$                     :REM*188
2Ø IF LEFT$(A$,1)="Y" THEN 6              :REM*86
3Ø POKE 52,48:POKE 56,48:CLR:POKE 56334,PEEK
   (56334)AND254:POKE1,PEEK(1)AND251      :REM*194
4Ø FORI=ØTO511:POKEI+12288,PEEK(I+53248):NEXT:
   POKE1,PEEK(1)OR4                       :REM*59
5Ø POKE 56334,PEEK(56334) OR 1            :REM*73
6Ø FOR I=49152 TO 49279:READA:POKEI,A:CK=CK+A:
   NEXT:IF CK<>17600 THEN 1ØØ             :REM*160
7Ø FOR I=49280 TO 49327:READ A:POKE I,A:NEXT
                                          :REM*32
8Ø POKE 53272,(PEEK(53272)AND 24Ø)+12     :REM*26
9Ø PRINTCHR$(147)"{CRSR DN}@ AUTO ANIMATE 64 @"
   :SYS49152:END                          :REM*69
1ØØ DATA 162,Ø,142,255,2Ø7,142,254,2Ø7,12Ø,162,
    21,16Ø,192,142,2Ø,3,14Ø               :REM*29
11Ø DATA 21,3,88,96,72,138,72,152,72,174,255,
    2Ø7,224,5,24Ø,12,232,142               :REM*153
12Ø DATA 255,2Ø7,1Ø4,168,1Ø4,17Ø,1Ø4,76,49,234,
    16Ø,Ø,174,254,2Ø7,189,128              :REM*1Ø
13Ø DATA 192,141,Ø,48,232,189,128,192,141,1,48,
    232,189,128,192,141,2,48               :REM*22
14Ø DATA 232,189,128,192,141,3,48,232,189,128,
    192,141,4,48,232,189,128               :REM*31
15Ø DATA 192,141,5,48,232,189,128,192,141,6,48,
    232,189,128,192,141,7,48               :REM*59
16Ø DATA 232,14Ø,255,2Ø7,224,48,24Ø,6,142,254,
    2Ø7,76,37,192,162,Ø,142                :REM*5
17Ø DATA 254,2Ø7,76,37,192,234,6Ø,126,255,255,
    255,255,126,6Ø,24,6Ø,126               :REM*243
18Ø DATA 126,126,126,6Ø,24,24,24,6Ø,6Ø,6Ø,6Ø,
    24,24,24,24,24,24,24,24,24             :REM*154
19Ø DATA 24,24,24,6Ø,6Ø,6Ø,6Ø,24,24,24,6Ø,126,
    126,126,126,6Ø,24                      :REM*2Ø6
```

STEVEN BOND
FORT WALTON BEACH, FL

$5C2 FILETYPE SCRATCH

Scratching files on the C-64 and C-128 is usually done by filename. But did you know that you can scratch by filetype as well? Here's the syntax to scratch all sequential files:

```
OPEN 15,8,15,"SØ:*=S":CLOSE15
```

To scratch user or program files, replace the S with U or P, respectively. This applies to all drives, including the 1581.

RICHARD PENN
MONTREAL, QUEBEC

$5C3 FILE ENCRYPTER 64/128

Finally, here's a Magic trick that nearly every C-64 and C-128 user can put to use immediately—File Encrypter 64/128. This programs encrypts files from either mode so that unauthorized viewing is difficult, if not impossible.

After typing and saving this program, run it and enter the name of the file to be encrypted. Then enter the name of the new encrypted file and its type (PRG, SEQ or USR), followed by a code number from 0 to 255.

To decode the encrypted file, simply run the program and reverse the process. The code number unscrambles the encrypted file, putting it back into its original state. File Encryptor works on virtually any type of word processing or Basic file. Unfortunately, it does not work with GEOS files. To speed up the process, remove the PRINT D$.

```
Ø REM ENCRYPTER 64/128 - H.VAHLENKAMP  :REM*73
1Ø INPUT "INPUT FILE: ";I$             :REM*118
2Ø INPUT "NAME OF OUTPUT FILE: ";P$    :REM*95
3Ø INPUT "(S)EQ OR (P)RG (S/P)";T$     :REM*47 ►
```

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```
40 INPUT "SECRET NUMBER (0-255) ";SC          :REM*1
50 PRINT:OPEN6,8,6,I$+","+T$+",R"            :REM*138
60 PRINT:OPEN9,8,9,P$+","+T$+",W"            :REM*229
70 GET#6,D$:IF D$=""THEN D$=CHR$(0)          :REM*236
80 SU=ST:V=ASC(D$):X=(SC OR V)-(SC AND V)     :REM*13
90 PRINTD$;:PRINT#9,CHR$(X);                 :REM*173
100 IF SU=0 THEN 70                           :REM*58
110 PRINT:CLOSE 9:CLOSE 6                    :REM*145
```

HENNING VAHLENKAMP
MATAWAN, NJ

$5C4 SCREEN RESTORER 64

Even experienced computerists sometimes forget that the C-64's screen is an output device, using a device number of zero. Screen Restorer 64 takes advantage of this often overlooked detail by saving the current screen to disk.

After running the program, use the CURSOR and CHARACTER keys to create and edit the screen to your satisfaction. When it's completed, enter a filename and press RETURN. The screen is saved to disk. Once saved, your screen can be reloaded for display using the syntax LOAD "FILENAME",8,1. Use this technique in your own programs for custom screens.

```
0  REM SCREEN RESTORER 64 - JAMES JONES       :REM*169
10 IF A=1 THEN A=2:GOTO 110                   :REM*126
20 PRINTCHR$(147)"MAKE A SCREEN, THEN ENTER A "
                                              :REM*154
30 PRINT"FILENAME AND PRESS RETURN."          :REM*112
40 CLOSE 1:OPEN 1,0:INPUT#1,F$:IF LEN(F$)>16
   THEN 20                                    :REM*159
50 INPUT#1,A$:CLOSE1                          :REM*146
60 CLOSE2:OPEN2,8,1,"0:"+F$+",P,W":PRINT#2,CHR$
   (0);CHR$(4)                                :REM*152
70 FORX=1024 TO 2023:PRINT#2,CHR$(PEEK(X));
   :NEXT:CLOSE2                               :REM*54
80 PRINTCHR$(147):PRINT"PRESS A KEY TO RESTORE
   SCREEN"                                    :REM*101
90 GET A$:IF A$="" THEN 90                    :REM*117
100  IF A=0 THEN A=1:LOADF$,8,1               :REM*198
110  GET A$:IF A$=""THEN 110                  :REM*212
```

JAMES JONES
KLONDIKE, TX

$5C5 VANISHING PIXELS 64

Programmers are constantly seeking new, eye-catching ways to clear the screen. I created Vanishing Pixels 64 as a new approach to screen clearing. When run, the program dissolves each character on the screen pixel-by-pixel until they've vanished completely.

Once the program is installed, the vanishing act commences with a SYS 49152. To make the characters reappear, use the following line:

```
POKE 53272,(PEEK (53272) AND 240) OR 4
```

Both commands are included in the program for demonstration purposes. Vanishing Pixels 64 can be used in your own programs for dramatic and unusual screen clearing.

```
0 REM VANISHING PIXELS 64 - RENLY DUTTON:REM*143
10 POKE 52,48:POKE 56,48:CLR:FOR I=49152 TO
   49355:READ A:C=C+A:POKE I,A:NEXT           :REM*154
20 IF C <> 25446 THENPRINT"ERROR IN DATA..."
   :END                                       :REM*143
30 PRINTCHR$(147)"VANISHING PIXELS 64!":FORT=1
   TO600:NEXT:SYS49152                        :REM*119
40 POKE 53272,(PEEK(53272)AND 240)OR 4        :REM*113
50 DATA 169,0,141,167,2,133,251,133,253,169,208,
   133,252,169,48,133,254                      :REM*78
60 DATA 162,7,160,0,189,196,192,157,52,3,224,0,
   240,4,202,76,21,192,120                    :REM*191
70 DATA 165,1,41,251,133,1,177,251,145,253,192,
   255,240,4,200,76,42,192                    :REM*129
80 DATA 165,252,201,223,240,9,230,252,230,254,
   160,0,76,42,192,165,1,9,4                   :REM*36
90 DATA 133,1,173,24,208,41,240,24,105,12,141,
   24,208,160,0,162,0,177                      :REM*83
100 DATA 253,61,52,3,201,0,240,7,177,253,93,52,
    3,145,253,192,255,240,9                   :REM*105
110 DATA 224,7,240,19,200,232,76,90,192,165,
    254,201,63,240,14,230,254                 :REM*158
120 DATA 200,162,0,76,90,192,162,0,200,76,90,
    192,173,167,2,201,8,240,14                :REM*241
130 DATA 238,167,2,160,1,173,52,3,141,255,2,
    76,162,192,88,96,185,52,3                   :REM*5
140 DATA 136,153,52,3,192,6,240,5,200,200,76,
    162,192,173,255,2,200,153                 :REM*169
150 DATA 52,3,169,48,133,254,162,0,160,0,76,
    90,192,128,2,32,8,1,16,64,4               :REM*233
```

RENLY DUTTON
WESTLAKE, CA

$5C6 SECRETS OF THE "CS"

Most C-128 users know a hidden message and the names of the C-128's designers are revealed by entering the command SYS 32800,123,45,6. If you have a C-128 with 64K of video RAM, you can reveal another hidden message with my program. Beyond revealing an otherwise hidden message in the 128, this program is a good test for whether your C-128 is equipped with 16K or 64K of video RAM. If the message is revealed in its entirety, then you have 64K. If the last message is scrambled, then you're using a 16K machine.

```
0 REM C-128 ROM SECRETS - H.VAHLENKAMP   :REM*119
10 BANK 15:S1=DEC("63F5"):E1=DEC("640B"):S2=DEC
   ("7FC0"):E2=DEC("7FF7")                 :REM*219
20 FOR L=S1 TO E1:PRINTCHR$(PEEK(L));:NEXT:PRINT
                                           :REM*218
30 FOR L=S2 TO E2:PRINTCHR$(PEEK(L));:NEXT:PRINT
                                           :REM*195
```

HENNING VAHLENKAMP
MATAWAN, NJ ■

Note: We have experimented with different typestyles for our Magic listings in the last few issues. Unfortunately, this caused some problems with several of our March/April listings. We apologize; you'll find corrections on page 59 in the RUN Amok box. Let us know whether or not you find the listings easy to type in.

Magic is RUN*'s forum where readers can share their programming "tricks of the trade." If you believe you have an idea whose time for greatness has come—a gem that you're convinced will make computing easier, faster or just more fun for other* RUN *readers, send it to: Magic,* RUN *Magazine, 80 Elm St., Peterborough, NH 03458.*

RUN *pays $10–$40 for each trick published. If you'd like a copy of* RUN*'s* Magic Trick Writer's Guide, *send a request with a self-addressed, stamped envelope to our offices at the above address.*

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News and New Products

The Consumer Electronics Show in Las Vegas always brings out the hottest products. Here's the new lineup for the C-64.

By JANICE GREAVES

Gear Up for High Action

BUFFALO GROVE, IL—Put on your camouflage fatigues and test your mapping skills with **Metal Gear** from Konami. This maze adventure has you winding through five levels as you search-and-destroy Metal Gear and end CaTaffy's terror spree.

Find valuable weapons and equipment in enemy trucks and storehouses, or buy them directly from soldiers of fortune. Transceiver communication with Commander South back at Fox Hound's Headquarters gives you crucial information on Metal Gear's whereabouts. The game sells for $14.95. From Konami, 900 Deerfield Parkway, Buffalo Grove, IL 60089.

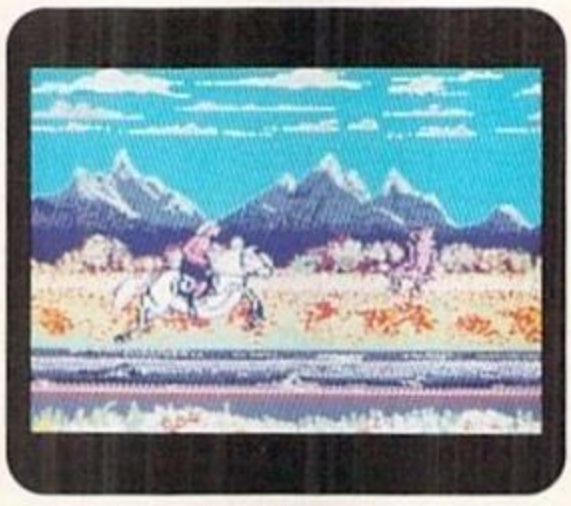
MicroLeague Companion

NEWARK, DE—Even Jim Palmer doesn't know this much! Bantam Books has just put out the definitive companion to MicroLeague Baseball—***The MicroLeague Baseball Field Guide***. The book, which comes with a disk, features a franchise-by-franchise synopsis of team history and a scouting report on each team covered by the MicroLeague game disks, plus tons of other relevant information to enhance game play and thrill sports fans. MicroLeague is located at 2201 Drummond Plaza, Newark, DE 19711.

ReadySoft's Latest

RICHMOND HILL, ONTARIO—ReadySoft, makers of Dragon's Lair and Space Ace, now challenges you to conquer the **Wrath of the Demon**. In true heroic fashion, you must rid the kingdom of an evil Demon and his minions, rescue the princess and restore honor to your King. Your quest will lead you through caves, swamps, temples and castles before reaching the ultimate challenge . . . the Demon himself.

Wrath of the Demon is a game cartridge with over three megabytes of graphics data, 600 screens of action and



Beware! Even the little monsters can get you in Wrath of the Demon.

more than 100 monsters—some of which are larger than half of the screen! Wrath of the Demon is available for $49.95 from ReadySoft Inc., 30 Wertheim Court, Unit 2, Richmond Hill, Ontario, Canada L4B 1B9.

Marty—It's Your Kids

BUFFALO GROVE, IL—Go "back" to 2015 with **Back to the Future II** by Konami. Return with Doc and the Delorean to save Marty and Jennifer's kids from just about everybody, including Biff, Griff, the police—even themselves!

Go Back to the Future with Marty and Biff.

This game has eight levels total, five mind-benders taken right from movie scenes, and three that place you in high-speed hoverboard action as you fend off Biff's thugs.

Back to the Future II is available for $39.95, in a special partnership with London's MirrorSoft, from Konami, 900 Deerfield Parkway, Buffalo Grove, IL 60089.

Fore! (. . . Or Was That Four?)

SAN JOSE, CA—Accolade introduces number four in its series of add-on course disks for the Jack Nicklaus golf series. This time, **Jack Nicklaus Presents The Great Courses of the U.S. Open**: Pebble Beach Golf Links, Oakmont Country Club and Baltusrol Golf Club. These courses are three of the most challenging, popular courses ever to host the U.S. Open.

Each course has seen amazing moments in golf history with players like Arnold Palmer, Tom Watson and, of course, Jack himself. The Oakmont course sports nearly 200 bunkers, and Baltusrol's terraced green and water hazards are notorious.

If you're up to the challenge, this add-on disk can be had for $14.95 from Accolade, 550 South Winchester Blvd., San Jose, CA 95128.

Electronic Arts Comes On Strong

SAN MATEO, CA—Whether you're a Machiavelli or a Ghandi, if political strategy is your bag, then try **Medieval Lords—Soldier Kings of Europe**. Up to 16 players (six human and ten computer) balance domestic and international political power in medieval Europe, Africa and the Middle East. Players advise a variety of rulers in six historical scenarios.

Manipulate political, economic and military elements at home and abroad to establish and strengthen your Lord's empire. Incite enemy provinces to re-

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volt, negotiate strategic alliances, award territory, build castles, declare war —whatever it takes for you to survive and prosper.

The game, designed by history professor Martin C. Campion, includes historically accurate events, including papal declarations of heresy, the Crusades, the Black Plague and Mongol invasions. Medieval Lords is well suited to solitaire, multi-player and classroom use. It sells for $59.95.

With a fast-paced scenario based on the critically acclaimed Clive Barker film, Ocean's **Nightbreed** recreates the twisted tale of Aaron Boon's attempt to escape the brutal ignorance of this world. Boon, fabled hero of the night, has been unjustly accused of murder. The police and a savage villain called The Mask infiltrate Midian, Boon's refuge and the home of a supernatural race called "the Breed." Nightbreed is available for $39.95.

Don't be fooled by the flesh tone . . . underneath that pasty exterior is a cyborg programmed for destruction—yours! **Crackdown** by Sega is an action adventure that takes you into the evil Dr. K's underground city. Your mission is to destroy the complex by setting bombs in all the right places: boiling sewers, laboratories, deserted depots and a dockyard teeming with cyborgs.

Take another "freedom fighter" down with you, or brave the 16 levels solo. Crackdown is being sold for $34.95.

SSI announces a new concept in air combat simulators: **Dragon Strike**. No jets, no machine guns; with this addition to the World of Krynn AD&D series, your combat-ready vehicle is a Dragon! Fight fierce hordes of enemies with a variety of unique weapons, including teeth, claws, lightning bolts and repulsion gas.

No jets with machine guns—in Dragon Strike, your combat-ready vehicle is a dragon.

Customize play by adjusting the flight control keys and selecting the level of graphic detail. Jump right into free-for-all combat or preview the landscape first on your handpicked mount. It's on the shelves for $39.95.

In the new UBI Soft release, **B.A.T.** (for Bureau of Astral Troubleshooters), you're an agent assigned with the task of saving Terrapolis from certain destruction . . . and with only 10 days left, it'll be quite an adventure.

You can visit over 1100 different places including restaurants, gun shops, bars, parks and bathrooms . . . you will live out every aspect of an agent's life in this role-play game. A computer implant in your arm assists you with language translations and warns you when enemy robots are approaching. For $34.95, you too can volunteer your services as a B.A.T. agent.

A shadow of evil cloaks the people of Yuria in Sega's new action adventure, **The Golden Axe**. The Death Adder terrorizes them, and only three heroes have the strength and cunning to stop the Dead Adder's terrifying reign: an amazon, an axe-wielding dwarf and a flame-throwing conan.

The victor must conquer the Death Adder's forces, so choose your weapons wisely. The Golden Axe is being offered for $34.95.

No rest for the wicked, or so they say. Just one year after defeating the forces of evil in Champions of Krynn, the undead Sir Karl swoops in on a Death Dragon and the champions are off again in **Death Knights of Krynn**.

Characters can be transferred from the other Krynn games, a feature not available with previous AD&D fantasy role-playing games. Any characters that are transferred from Champions of Krynn will be able to keep their items and money.

Death Knights of Krynn is available for $39.95. The clue book is $12.95, and is sold separately.

The craziest reflex game yet has just been released by UBI Soft. In **Pick 'N Pile**, a multitude of colored balls are falling from the sky and it's up to you to make them disappear. You must swap shapes, create columns and empty the screen before time runs out. Obstacles that fall in your path might help you—or they might hurt you! Get Pick 'N Pile for $29.95.

Ocean Software challenges you to take on the Mob with **The Untouchables**, on their most dangerous and exciting mission yet! Lead crimefighter Elliot Ness's elite team in five missions through Al Capone's Chicago: the Warehouse Bust, the Border Raid, the Alleyway Shootouts, the Railway Station Confrontation and the final Rooftop Duel. Could be hot for $29.95.

Order all these games from Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404; 800-245-4525.

Bodacious!

MIAMI, FL—Capstone Entertainment Software has released **Bill and Ted's Excellent Adventure**. The game includes

Genghis Khan helps Bill and Ted pass history class.

actual digitized pictures and sounds from the movie, and follows its story line. With the help of Rufus and his time machine, Bill and Ted have to collect various historical figures to pass a history exam. A "bodacious" adventure against the clock. Bill and Ted is available from Intracorp, 14160 S.W. 139th Court, Miami, FL 33186, for $29.95.

Michelangelo Would Be Proud

DALLAS, TX—Merit Software has a new Electric Crayon computer coloring book for children, starring the **Teenage Mutant Ninja Turtles**. It features 30 Ninja Turtle pictures to color, plus custom banners, calendars, pictures and stories to print. And each stop on the Turtles' World Tour is accompanied by an educational description. Get this version of the new "fab four" at $14.95 from Merit Software, 13635 Gamma Road, Dallas, TX 75244. ■

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MAIL RUN

This issue, readers hear from the VP of Origin, offer a few words in support of user's groups and provide some practical advice.

SUPPORT GROUPS

As president of the Mayodan Commodore User's Group, I can't express enough the importance of user's groups to the survival of the C-64 and 128. I feel that *RUN* should have a special section dedicated to user's groups, such as a group list or a page for announcements and information.

—VAN HURD
PRESIDENT, M.C.U.G.
MAYODAN, NC

Guess what? You'll find a pull-out list of Commodore user's groups between pages 32 and 33 in this issue. Any additions or updates will gladly be published in Mail RUN.

—EDITORS

A LETTER TO RUN READERS

Let me clear up some confusion that has been created over the Origin ad for Bad Blood on the back cover of the January/February issue of *RUN*.

In the Bad Blood ad, we inadvertently left out a banner that was intended to proclaim "Bad Blood: **Now available for Commodore 64/128.** Screens shown are from the IBM/VGA original release."

Our sincerest apologies for whatever confusion this may have created for you, our valued customers. For the record: Origin is pleased to provide high-quality entertainment software for that workhorse of a little computer, the C-64.

Also, as is often the case with software development, Bad Blood and Ultima VI were not completed on time and had to be held until after the holidays for release. By the time this letter is printed, *RUN* readers should be seeing both products for the C-64 on the store shelves. We apologize for the delay in our release date.

—FRED SCHMIDT
VICE PRESIDENT & GENERAL MANAGER
ORIGIN SYSTEMS, INC.

Thanks for the clarification. (We didn't want our readers to think we were abandoning them for MS-DOS owners!) We are, as we've always been, devoted to the C-64/128 market. Watch for reviews of Bad Blood and Ultima VI in upcoming issues.

—EDITORS

"ADDRESSER" ADDITIONS

I enjoyed Kevin McDonald's "Envelope Addresser"(January/February '91). For smaller envelopes ($3^5/_8 \times 6^1/_2$), I made the following changes:

```
870 FOR X=1TO7-R:PRINT:NEXT:REM 229
880 FOR X=1TOA:PRINT SPC(20)A$(X):
    NEXT                        :REM 210
```

For a little color, you may want to add:

```
15  POKE 53280,0:POKE 53281,0:PRINT
    "{CTRL8}"                   :REM 30
```

—PETER GEIGER
LOMPOC, CA

SUGGESTIONS, CORRECTIONS & HATS OFF TO NORMAN ROCKWELL

In your January/February Mail RUN response to Robert W. Reed concerning the *GEOS Programmer's Reference Guide*, you suggested he buy it from Berkeley Softworks. What Berkeley sells is not the above named, but a book called the *Hitchhiker's Guide to GEOS*, which is 350 double-sided, xeroxed pages of notes and information. This "book" contains much of the same material, but doesn't have the same informational and tutorial approach as the *Reference Guide*. It is the only option available, however, at this time (unless you stumble on a used copy of the *Reference Guide* somewhere). Since the original publisher of the *Reference Guide* (Bantam) has no plans to release a second edition, perhaps IDG (*RUN*'s parent company) could license the rights and reprint it.

On another note, I was dismayed to see that *RUN* didn't at least give inspirational credit to Norman Rockwell for the March/April cover idea. It was a takeoff on one of Rockwell's most famous *Saturday Evening Post* cover illustrations.

Finally, a few mechanical errors in the last issue. The crossword (page 55) has a mistake: Number 14 across should have six spaces, not five. Also, some page numbers in the Table of Contents are incorrect. I know I'm nitpicking; but it's not to say I don't enjoy *RUN*—I do, and look forward to the arrival of every issue.

—JIM GREEK
NEW YORK, NY

We appreciate your observations and hope all our readers are as interested in the magazine as you obviously are. Your corrections are on the mark: See the RUN Amok box on page 59. The Table of Contents?—oh well, something happened. Sorry. We thought our nod to Norman Rockwell on the cover would be obvious because of his well-known, even clichéd style. No slight was intended.

—EDITORS

COMMODORE CLINIC MIDI MAIL

For readers with MIDI/64 questions (Clinic, January/February '91), the best resource I know of is the Mix Bookshelf, 6400 Hollis St. #12, Emeryville, CA 94608; 800-233-9604.

—VICTOR EFIMETZ
PATCHOGUE, NY

Regarding last issue's MIDI questions, it should be noted that RIO Computers, 3430 E. Tropicana Avenue #65, Las Vegas, NV 89121, offers the following:

- MIDI 64 (full-spec. MIDI) $49.99
- MIDI cables (5 ft., pro. quality) $8.99
- Advanced Music System (MIDI software) $29.99
- Digital Sound Sampler (software) $89.95

I recently bought a defective MIDI 64 from them and they promptly replaced it. I highly recommend RIO Computers.

—SAMUEL HAND, JR.
COLUMBIA, SC

PRACTICAL ADVICE

Thanks for your honest editorial in last issue's RUNning Ruminations. It seems that all other Commodore-specific publications are now history. OMNI's publication *Compute* is not at all beneficial to me. To insure your continuation, I would like to suggest the following:

Poll your subscribers to see if they will stick with you at a higher subscription cost.

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Reduce your expenses by using less costly materials and less color.

Finally, encourage more reader participation and sharing.

—Elmore Stuart
Lawrenceville, GA

Thanks. We are interested in any ideas our readers have regarding the future of RUN.

—Editors

Printing Tips

Your tip about the Star NX-1000c (Pro-Tips, January/February '91) was only partially accurate: It's true only if you're using a Commodore-compatible printer driver. Better drivers for this printer do exist.

If you set the DIP switches 1 and 5 to off, leaving all the others on, you can use the Epson FX-80 driver. The FX-80 is a good driver, but there is a superior driver, called Epson8pin3pass, on Q-Link. It prints at 240 dpi and smooths the print. It will also let you print the NLQ Courier font that resides in the printer (in place of the Commodore 10-point font). These DIP switch settings and the Epson driver can also be used for Printshop side A.

—Gary Hinshaw
Arcadia, IN

How About a CD-64?

With the rapid growth in the personal computer market, it looks like we who were pioneers with the C-64 are being left behind to cough in the dust of progress. The advances being made today are for other machines. Although a hard disk is now available for the C-64/128, the cost is prohibitive. A last straw in our frustration is the advent of the CD-ROM. PCs and Macs can be equipped with CD-ROM devices. Will a CD-ROM ever be available for the Commodore?

The one main redeeming advance is GEOS, which has made the Commodore a truly efficient machine. Commodore should have packaged its computer with GEOS, a disk drive, an REU, a printer and a monitor and sold it at half of the price of a similar PC. It would have outsold all the others combined.

—Jerome Valentine
Tamarac, FL

"Timing is everything." We know many early users who paid over $600 for a C-64. Today you can buy one with a disk drive, color printer, color monitor and GEOS and QuantumLink software for under $450—which is certainly "half the price of a similar PC."

As for a CD-ROM for the C-64, maybe some third-party developer will bring one to market. About a year ago, Camerica told us it was introducing a CD player interface for the C-64, but ran into technical problems and had to delay the product. Who knows? Maybe a CD-ROM for the 64 will appear.

—Editors ■

Speak Up! Send your letters to Mail RUN, c/o RUN *Magazine, 80 Elm St., Peterborough, NH 03458.*

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SOFTWARE GALLERY

This issue's spotlight shines on such luminaries as Carmen Sandiego, Donald Duck, Buck Rogers, Fred Flintstone and those red-hot Teenage Mutant Ninja Turtles.

By WALT LATOCHA

WHERE IN TIME IS CARMEN SANDIEGO? ..... A–

Crook-Catching Through the Ages Is Educational and Fun

Carmen Sandiego is that rare type of criminal that even Dick Tracy would love. Instead of inflicting grief on her victims, she brings learning and enjoyment to thousands of fans.

The latest adventures of this computerized villainess unfold in Where in Time Is Carmen Sandiego?, a game intended for players 12 to adult. The program comes on two disks and is accompanied by the paperback *New American Desk Encyclopedia*. While playing, you can visit 12 nations during 15 centuries and receive more than 1200 clues.

Carmen and her new gang of 15 henchmen are using time-travel to steal Napoleon's hat and other famous historical objects. With a device called a Chronoskimmer, you must identify and track down each gang member as he or she flees both through time and from one country to another.

Searching locations for physical evidence and interviewing witnesses and informants are your main tactics. Aids include an electronic notebook and dossiers on all the thieves. The software also includes a save feature that lets you take breaks from your battle against crime.

You succeed in the search by efficiently interpreting clues earned by correctly answering questions. While the previous Carmen Sandiego programs focused on modern geography and culture, the new game rewards knowledge of history as well.

Two minor warnings are in order. First, you'll probably need reference works other than the encyclopedia to enter the game's Hall of Fame. Also, the software makes you look up some rather obscure facts. During one session, for example, I learned about the Sepoy Rebellion, an event I hadn't heard of before and probably won't run across again.

For most people, the program's many attractions will far outweigh these problems. Not only does it have superb graphics and an extremely friendly menu-driven interface, it also satisfies different needs. If you're interested in education, the program does an excellent job of developing deductive reasoning and research skills, in addition to teaching facts about history and geography. If you just want solid entertainment, it shines either as an engrossing mystery or a trivia challenge.

India
The empire of the Guptas has been called "The Golden Age of India." The painting of Ajanta and the Great Buddha at Sarnath are fine examples of their artistic ability.
TIME LEFT
27 HRS

This time you have to figure out WHEN Carmen is, not just WHERE.

Where in Time Is Carmen Sandiego? is both worthwhile and fun. After playing this game and its predecessors, I hope Carmen's criminal career never ends. *(Broderbund Software, 17 Paul Drive, San Rafael, CA 94903. C-64/$39.95. School Edition and Lab Pack versions are available for $49.95 and $99.95, respectively.)*

REPORT CARD

A Superb!
An exceptional program that outshines all others.

B Good.
One of the better programs available in its category. A worthy addition to your software library.

C Average.
Lives up to its billing. No major hassles or disappointments here.

D Poor.
This program has some problems. There are better on the market.

E Failure.
Many problems; should be deep-sixed!

GOOFY'S RAILWAY EXPRESS.... B
DONALD'S ALPHABET CHASE .. B
MICKEY'S RUNAWAY ZOO ..... B

Disney Toons Score High Marks

Walt Disney Computer Software, a new publisher, recently released three value-priced titles that feature some of the world's most famous cartoon characters. The programs present simple, nonthreatening lessons about shapes, numbers and letters. All are intended for children two through five.

In Goofy's Railway Express, the train that Goofy guides through seven screens periodically releases a colorful shape from its smokestack. Pressing the space bar makes the train whistle blow as the figure becomes part of an animated object. An oval, for example, is transformed into the body of a blinking and hooting owl. You can also make Donald Duck, Uncle Scrooge, Daisy Duck or Pluto board the train when a shape appears that matches one floating above the character.

Donald's Alphabet Chase contains six locations where from three to five letters hide. Pressing a key starts an animated sequence in which a letter appears and is captured by Donald.

In Mickey's Runaway Zoo, you press number keys to hunt for escaped animals in four neighborhoods. For example, the appropriate key on the city street screen flushes six hopping kangaroos from under a cafe table. A counter over a zoo wagon keeps track as they emerge, one at a time.

Two- and three-year-olds will probably ►

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The number over Mickey's wagon helps kids count as the animals jump in.

enjoy and perhaps benefit from these games. As the literature indicates, pressing just one key at the proper time ensures success and avoids frustration. However, older preschoolers may soon become bored.

Children of all ages, and adults as well, will be impressed by the rich graphics and superb animation of the programs. These visual delights beautifully support the activities of Goofy, Donald and Mickey. If Disney Software continues putting its illustrious characters in such striking settings, this company should be a big success in the C-64 market. *(Walt Disney Computer Software, 500 South Buena Vista St., Burbank, CA 91521. C-64/$14.95 each)*

BEETLEJUICE PRINT KIT ..... C+
GREMLINS II PRINT KIT ..... C+
JETSONS & FLINTSTONES PRINT KIT ..... B–

Send Whimsical and Weird Things to Your Printer

With these three new releases, Hi Tech Expressions continues its series of pop culture desktop publishing software.

The Beetlejuice Print Kit contains graphics of characters in the animated TV series inspired by the blockbuster film. In the Gremlins II program, Gizmo, Lenny and six other strange creatures from the 1990 film appear. With the Jetsons/Flintstones software, you can print pictures of George Jetson and his family and friends, as well as Fred, Barney, Wilma, Betty and Bedrock's other famous citizens.

These menu-driven programs can produce signs, stationery, banners, storybook pages, masks, puppets and three styles of one- or two-sided greeting cards. Each disk includes approximately 60 graphics depicting the characters in various poses and settings; it also contains 20 borders. You can choose where the graphics and borders appear on your printed document, as well as select image sizes.

Hi Tech also lets you merge text with

DUCK TALES: THE QUEST FOR GOLD ..... B

Will Scrooge Make the Cover of Dime *Magazine?*

As Scrooge McDuck, your biggest desire is to be on the cover of *Dime*. But in order to earn that honor, you have to win the challenge issued by Flintheart Glomgold: Whoever can collect the most money within 30 days becomes *Dime*'s rich man of the year.

Glomgold offers three options: easy money, standard wages and hard-earned cash. Easy money isn't. But, all things are relative; beginners should take the easy way out.

There are two basic routes to wealth: investment in the stock market and searching the world for treasure. One is about as risky as the other. Scrooge can invest some or all of the money he earns on his treasure hunts in about two dozen stocks. Brief market news bulletins offer updates and forecasts on the companies.

In addition, the *Junior Woodchuck Guide* supplied with the game has five charts showing how various stocks behave over a 30-day period. A calendar on the screen shows how many days have passed since the McDuck-Glomgold money race began. By keeping an eye on the calendar and watching the charts, it's possible to pick up a lot of extra cash.

Beware. Glomgold sometimes throws a wrench into the market by making shady deals. These can suddenly send prices tumbling.

The action takes place around the globe. You use the world map in Scrooge's office to seek treasures and pick destinations from more than two dozen locations. At those locations, conditions vary.

Huey, Dewey, Louie and Webby, Scrooge's helpful nephews and niece,

Glomgold's challenge could get Scrooge McDuck on the cover of *Dime*.

may need to climb mountains, survive in the jungle, explore caves or photograph wild animals to help their uncle earn treasure points. They travel in Launchpad's airplane with its bouncable Flubber Aircraft construction. That's Disney Software's way of saying the plane is pretty forgiving. It will bounce off barns, power lines and the altitude ceiling. Well, almost always—even Flubber can't withstand constant abuse.

That's the plot. Now here's how it plays. There's a lot of material to cover in this game. The *Junior Woodchuck Guide* is helpful, but its presentation is disjointed. For instance, the object of the game ("How to Change the Balance of Power") is explained in the final paragraph of the last page. To find out how to climb mountains, explore caves and perform other treasure-hunting tasks, consult the C-64 game card, because the guide is of little help. Even the game card should be more specific about how to perform various tasks.

Duck Tales is not copy-protected, but requires you to find and enter a code word in order to play. Be prepared for much disk swapping and waiting for sections to load. The game occupies two double-sided disks, and a single game may involve nearly two dozen disk changes. At 15 to 30 seconds each for loading sequences, you'll appreciate an adage Scrooge would love: "Time is money."

Otherwise, Duck Tales is a cute game with nice graphics. It's fun to try to rake in more money than Glomgold, but be prepared to spend time practicing mountain climbing and swamp survival. And remember the unwritten Woodchuck motto: "Be prepared . . . to wait on the disk drive." *(Walt Disney Computer Software, 500 South Buena Vista St., Burbank, CA 91521. C-64/$29.95)*

—LONNIE BROWN
LAKELAND, FL

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the pictures. You can choose from seven fonts, seven text styles and three to eleven text sizes for cards, signs, stationery and banners. Left justification, text masking and other editing features are also available.

Hardware compatibility is indicated on the packages, but the listings are incomplete and contain at least one error. You must look inside the box to find compatible printers and interfaces.

Unfortunately, the programs are missing a desirable element, too: There's no preview screen showing your pictures before printing. The software does, however, display rectangles containing blocks and lines to suggest your layout.

Also, these print kits, like many similar programs, demand a great deal of careful reading and study to operate successfully. Because of this, young children will become frustrated without help from an adult.

Notwithstanding these shortcomings, the Hi Tech print kits provide an amazing number of features for a very low price. They can serve as an excellent introduction to desktop publishing, an exciting and creative uses of the C-64. *(Hi Tech Expressions, 584 Broadway, New York, NY 10012. C-64/$14.95 each)*

THE KEYS TO MARAMON.....A–

Magical Role-Playing That's Appealing and Addictive

Though huge programs like the Ultima series and Buck Rogers: Countdown to Doomsday (see the review on p. 18) currently dominate the C-64 role-playing market, they're definitely not for everyone. That's why many players will thoroughly enjoy The Keys to Maramon.

Mindcraft constructed this program using many classic elements. The setting is a town overrun by orcs, gnolls and other supernatural horrors, which spew forth from subterranean dungeons. To overcome this evil, first you must select a hero from four characters, each with his or her own strengths and weaknesses. Next, you must explore Maramon and discover what resources are available. You'll find shops where armor, herbs, weapons and magical devices are sold, and encounter townsfolk who offer helpful information. There's even a library that holds ancient secrets.

And, of course, there's combat. Not only does your hero engage in both ►

WORD WRITER .....A

Successful Desktop Publishing With Your Word Processor

Word Writer 5 is the latest attempt to give the C-64 some basic desktop publishing capabilities, and the attempt succeeds. There are a few disappointments, however, which lie more in the limitations of the C-64 than in Word Writer 5.

This is a full-featured word processor. It has a dictionary with word-count, a thesaurus, an 80-column Preview mode and an outliner. Moving, copying and deleting blocks of text are fast and easy. A keyboard overlay and pop-up menu list most of the commands, and it's easy to look up unfamiliar commands in the manual's alphabetized list.

New to Word Writer 5 are the graphics functions. There are nine typefaces to choose from, plus a letter font called Doodad that substitutes symbols for letters. Most of the typefaces range in size from 9 to 36 points, and the size of all fonts can be doubled using the expand feature when printing. While sizes and type styles can be combined, you may use only ten fonts per document. The appendix in the manual shows the appearance and size of each font.

The package includes more than 150 graphics images, and its graphics converter will import drawings created with GEOS or Doodle!. The converter can reverse, flip and crop images, too.

Timeworks makes it easy to get Word Writer 5 running. The documentation includes a 12-page mini-manual with all the basic information a novice needs. An external program, Install, is used for system configuration as well as printer and font selection. Install supports more than 120 specific printers, in addition to providing a number of generic Epson-like settings.

Printing a document in Font mode on a Panasonic KX-P1124 24-pin printer produced excellent results. The graphics were sharp and full of detail, and the fonts were distinct, with no bleeding along the edges. Even letters over 1/4-inch tall had straight lines and smooth curves.

Of course, there is a price for all this power, and the price is *speed*. The document I printed contained one graphics image and 64 words, and took nine minutes to print.

You can reduce printing time by mixing Font and Text modes. If no special type styles are needed for a portion of a document, print in the normal Dot Matrix mode, then move to Font mode only when enhancements are required.

The dictionary is slow, too. Spell-checking the same 64-word document took almost four minutes using a 1571 disk drive. Another file, 900 words long, took more than seven minutes. Times decrease by more than 60 percent when a 1581 drive is substituted for a 1541 or 1571.

Word Writer 5 is not copy-protected, so you can move most of the files and programs onto the disk of your choice. The only exception is the thesaurus, which uses relative files and can't be transferred with a file copier. However, the thesaurus is small and the speed benefits of the 1581 quite outweigh the loss of a few synonyms.

The 80-column preview screen does not displays graphics or true representations of the fonts, so lines don't appear in their actual positions on the page. However, spacing, carriage returns and page breaks are accurate.

Word Writer 5 will exchange files with other word processors and GEOS, but you must use Install to select the proper file configuration. Only Word Writer files can be loaded directly.

The program can store approximately 11 pages of single-spaced text before running out of memory and can link files to create longer documents. The linked files will print out automatically as one, but only in Text mode.

Timeworks offers 60 days of telephone technical support to purchasers, as well as a 30-day, satisfaction-guaranteed refund. Accessory packs of additional fonts and graphics are available by mail for $9.95 each.

Prices for program updates vary according to the version you're updating from. Details are available from customer service at Timeworks.

Word Writer 5 is an excellent choice for embellishing documents with a variety of type styles and graphics. Patience is required when printing, but the output will rival any other currently produced on a dot matrix printer. *(Timeworks, 444 Lake Cook Road, Deerfield, IL 60015-4919. C-64/$39.95)*

—MICHAEL CAVANAUGH
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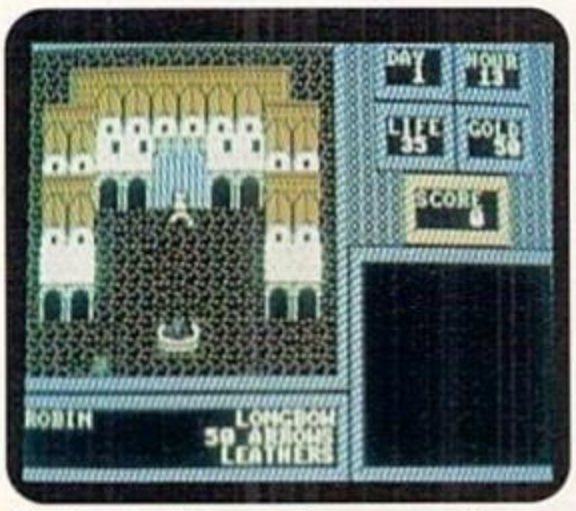
hand-to-hand and long-range fights with the monsters, he or she can wreak destruction with fire globes or magical land mines that explode when stepped on. Winning battles not only earns money but adds to your character's level of experience.

Mindcraft imposed time constraints on the game to make play more interesting. For example, you must destroy all the vile creatures on the streets before a new day dawns; otherwise, Maramon suffers serious damage that can make your purchases more costly.

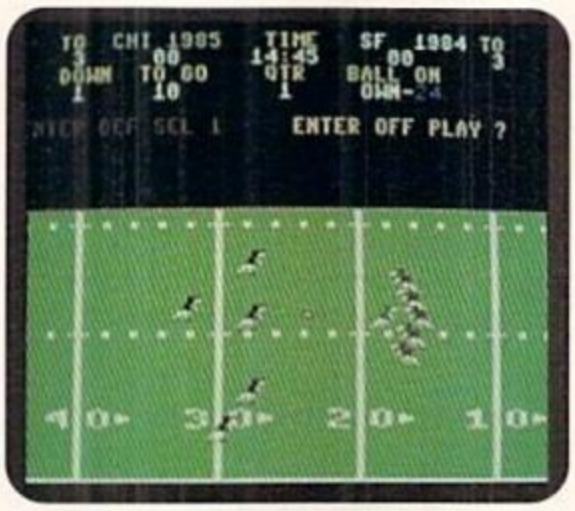
The game has very good graphics and animation. Even better is an extremely user-friendly joystick control system for selecting menu options and moving your on-screen surrogate in battle. These features nicely support a truly engrossing story line.

Critics might claim that the game is too



The Keys to Maramon is an engrossing challenge for gamers of all levels.

easy. While this may be true for some veteran players, both novice and experienced gamers who want a manageable challenge will relish The Keys to Maramon. This well-constructed program is a welcome addition to the role-playing genre. *(Mindcraft Software; distributed by Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. C-64/$34.95)*



Football fans are sure to enjoy MicroLeague Football during the off season.

MicroLeague Football.....B+

Return to Pigskin Fever

Licensed by the NFL Players Association, this game contains 20 classic teams from the past—the 1977 Dallas and 1983 Miami squads, for example. You can guide one set of players while a human opponent or the computer coaches another, or you can watch as two teams are directed by your C-64.

When controlling the ball, you choose from 24 plays and four formations, as well as designating a running back or pass receiver. Meanwhile, the defense has eight strategies at its disposal, and can blitz, key on particular backs and double team ends or flankers.

The program is packed with options, including substitutions, fumbles, injuries, penalties and two-minute drills. You can toggle on and off some straightforward animated displays of the action, and a quick-play mode will finish a contest for you in seconds.

Of special note is the software's impressive statistical capabilities. You can display and print both the offensive players' real-life records and your team's defensive ratings, which, together with your play-calling ability, determine the outcome of a game. And a program-created stat disk provides a detailed summary of team and player performance.

This is no-nonsense mental challenge, stripped down from the real world of professional football. Calling plays is your only control over a game, and to call them successfully you must have or develop a solid knowledge of tactics.

You must analyze and experiment to fill in a few gaps in the instructions. However, the intended audience of MicroLeague Football will consider this a minor problem. This game's many features will give pigskin fanatics something to think about besides the past season. *(MicroLeague Sports; distributed by Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. C-64/$29.95. Available as supplements: a General Manager/Owner program for $24.95, also 1989 and 1990 Season disks for $19.95 each)*

Teenage Mutant Ninja Turtles C

Cowabunga? Less Than Excellent

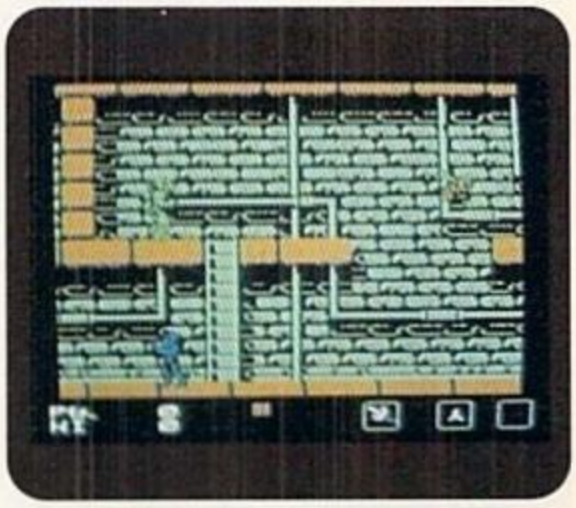
After a long delay, the C-64 version of Teenage Mutant Ninja Turtles (TMNT) has finally been released. Unfortunately, it turns out that the wait wasn't worth it.

The game, on two double-sided disks, has six levels. You begin by following on-screen maps and hints to guide your heroes through sewers in an attempt to rescue their friend, April O'Neil. After that, there's an underwater adventure in the Hudson River, then it's on to Wall Street, JFK Airport, the Bronx and, finally, the Technodrome, the futuristic lair of the Shredder. Defeating this malevolent genius and restoring Splinter to human form are your ultimate goals.

Each Turtle has abilities that are useful in some situations, but not others. You exploit their talents by switching from one to another. You also use weapons, ropes and energy-restoring pizza to help fight hordes of bizarre enemies.

TMNT lets you save high scores to disk. It also has a save-game option, a rarity in arcade contests.

While the game is complex and contains many attractive features, it has



The turtles fight their way past killer bees in the sewers of New York.

some serious flaws. Its graphics tend to be blocky and indistinct. More serious is the need to press the joystick button both for jumping and using weapons. Some arcade aces may be comfortable with this arrangement, but most players will find it aggravating. Although the Teenage Mutant Ninja Turtles have conquered movies, TV and comics, it looks like success on the C-64 is beyond their powers. *(Ultra Software Corp.; distributed by Konami, 900 Deerfield Parkway, Buffalo Grove, IL 60089-4510. C-64/$29.95)*

Buck Rogers: Countdown to Doomsday .....A

Blast Off to the Future And High Space Adventure

Strategic Simulations, Inc., (SSI) has temporarily abandoned its recent strategy for successful software. Instead of releasing another fantasy game, it has produced Buck Rogers: Countdown to

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Doomsday, a role-playing game set in the far future.

Fans of the recent Buck Rogers TV show will find that the software creates a vastly different universe. For example, it makes defeating an evil corporate behemoth the main goal of the legendary 20th-century astronaut who awakens after a long sleep.

To accomplish this mission, you select six characters, representing a half-dozen races, and assemble them into a team. The abilities, attributes and fighting skills your recruits begin with, and how they develop, will largely determine your success.

During game play, your squad rockets throughout the solar system, engaging in ship-to-ship space battles, exploring planets, asteroids and the moon, and meeting all sorts of bizarre extraterrestrial beings. Players of SSI's other role-playing games will recognize many familiar elements. For instance, your on-screen characters must survive a great deal of both ranged and hand-to-hand personal combat. Non-player characters offer valuable information, and you can buy or sell armor and weapons, including microwave guns and plasma launchers.

The Buck Rogers package is quite impressive physically. In it you'll find not only three double-sided game disks, but a log book, a rule book and a reference card for the C-64. In addition, for a limited time the package includes the paperback of *First Power Play,* a novel set in the milieu that the program creates.

Many features of the game itself are also noteworthy. For instance, an enhanced version of SSI's Advanced Dungeons & Dragons fantasy role-playing system provides a framework for your mission, with user-friendly menus that are accessed with a joystick. Other elements you'll appreciate include great graphics, a demo mode, five difficulty levels and a pre-saved game that lets you begin heroic adventuring almost as soon as you open the box.

All of these features result in a game that's demanding and at the same time very entertaining. Its components mesh beautifully with one another, producing a relatively fast-paced and extremely satisfying gaming experience. If you want to lose yourself in a vast adventure with a refreshingly different theme, I highly recommended Buck Rogers: Countdown to Doomsday. *(Strategic Simulations, Inc.; distributed by Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. C-64/$39.95. A clue book is available for $12.95.)*

ARTURA .....B+

This Medieval Mind-Boggler Is Solid Entertainment

Arcadia used the wizardry of programming to produce Artura, a recreation of the medieval world of the Round Table. The game takes place in the maze-like castle of Morgause, a villainess who has kidnapped the beautiful Nimue. Nimue possesses supernatural powers that can benefit you. You must rescue her, and then return to become the ruler of your people.

By joystick, you explore Morgause's trap-filled stronghold, hurling your axe against hordes of fiends. To aid your quest, you find food that heals wounds and magical rune stones that teleport you to secret rooms that are otherwise inaccessible.

Frustrated gamers can turn to lists in the manual of the locations of the food and rune stones, as well as a map of the castle. Unfortunately, the map doesn't include a legend to the symbols on it. To remedy this shortcoming, Arcadia now offers a free printed supplement that will help you decipher the map.

Artura's main attraction is its unique atmosphere, skillfully created through medieval background music, unusual animation and crisp graphics.

In addition, its puzzles provide stimulating, satisfying mental challenge. *(Arcadia; distributed by Virgin Mastertronic, 18001 Cowan St., Irvine, CA 92714. C-64/$14.99)* ■

Walt Latocha is a contributing editor for RUN *and a Software Gallery columnist. Walt has extensive experience playing, reviewing and writing about entertainment software for the C-64 and 128.*

THE NOTABLE PHANTOM ....B+

Music to Young Ears

The Notable Phantom, part of DesignWare's Music Teacher Series, includes three games that teach youngsters five to ten how to identify written musical notes, the tones that go with the notes and the piano keys that produce the tones. An overlay in the package turns the keyboard into a one-and-a-half-octave piano.

You can play the games separately or alternate between them. In the first, a ghost turns into a note on the screen's musical staff and you must play the correct note on the keyboard. In the second, a spider carries the name of a musical note onto the screen and you must play the correct note. In the third, you must play the note that a phantom hums. Each game is well-executed and fun.

You can also play tunes on the computer piano, compose, save and replay tunes and play 20 well-known tunes supplied on the disk—all in two computer voices. A song book contains sheet music for the on-disk tunes and empty staffs for your own compositions.

This is not a program a child can learn to use alone. The complexities of the menu and the language of the manual call for initial adult guidance. *(DesignWare, 185 Berry St., San Francisco, CA 94107. C-64/ $9.95)*

CRYPTO CUBE .....D

"Tedious" Is the Right Word

Crypto Cube, DesignWare's C-64 spelling game for players eight years and up, is more fun to set up than to play. The object is to expose the hidden words that make up four crossword puzzles on an on-screen cube. The crosswords are built from the same word list, and DesignWare has provided lists on a wide variety of themes.

Unfortunately, the lists contain a few misspellings, and the program uses a lot of disk accesses. Moreover, the Wuzzle, a little on-screen figure, makes you wait too much while he dances.

Although solving the puzzles is tedious, creating your own word lists and puzzles isn't. The Wuzzle doesn't intrude there, and you get more involved with the words. You can either build a word list, then let the program design the puzzle, or design the puzzle yourself. Either way, your creations can be saved to disk (which takes ten minutes to format).The manual contains clear instructions and all the word lists—spelled correctly. *(Designware, 185 Berry St., San Francisco, CA 94107. C-64/ $9.95)*

—PEG LEPAGE
RUN STAFF

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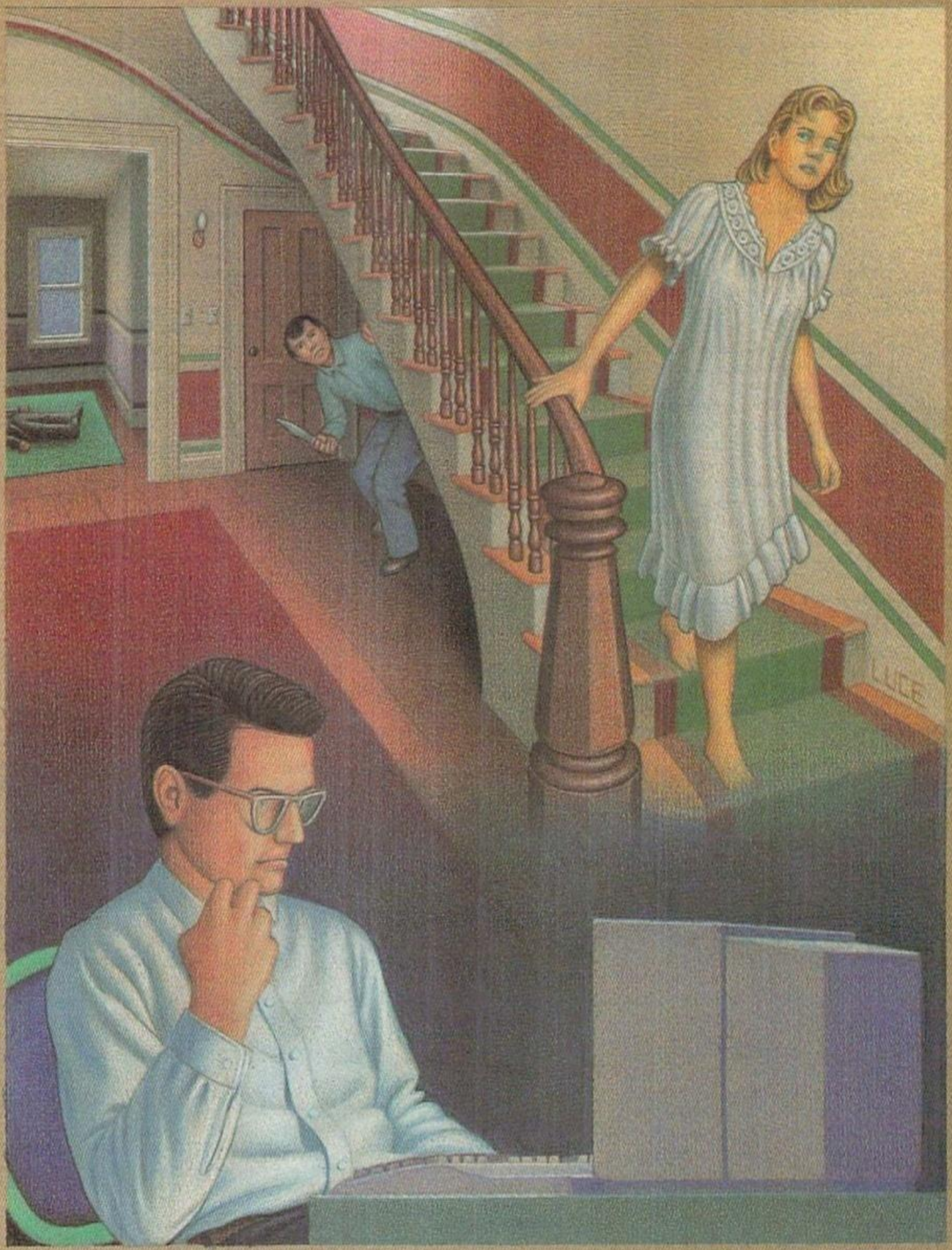

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It Was A Dark And Stormy Night . . .

Now you can publish that book you've always wanted to write, on disk, and enter RUN*'s contest for the best creation.*

By MARK JORDAN

Why haven't you written that book yet? You have what it takes: ideas and expertise, a good computer and word processor, and a desire to communicate. The answer is simple: It's too difficult to get published. Less than one percent of all book manuscripts submitted ever see the printed page. Getting published takes an extraordinary amount of luck and timing, not to mention writing ability. So, you do what everyone else does: You don't write the book.

That's a pity, because all you really lack is a slight change in your definition of "book." Just add "other media" besides "paper" to the definition, and you're on your way to becoming a published writer.

I'm sure I don't need to tell you what "other media" I'm talking about—disks! That's right, *bookdisks*. It's an idea whose time has come. Think about the advantages: guaranteed publication; instant updates; nightly press runs; low overhead; space-efficient storage; cheap mailing; ecologic-soundness; and maybe a way to fame and fortune.

The only investment needed to get started in the publishing business is time and sweat. Begin by typing in and saving BookDisk, the program in Listing 1. It's the interface others will use to read your book, so it will go on each bookdisk you send out.

The program comes to you as a Basic loader, but once you've got it typed, saved and installed, it's a lightning-fast machine language file-reader. Its features include word counting, printing, a bookmark, a file-loader, a handy help screen, and more.

With BookDisk and the book you write, you're two-thirds of the way to being a published author. *RUN* can help with the last leg of the journey—getting the word out. In an upcoming issue, we'll publish a listing and brief descriptions of some of the best bookdisks we receive. Free advertising! We'll also market the winning entries on a special bookdisk. All you need to do is write your book and send it in. *All?* Just write a *book?*

Okay, so it's a big job. But writing a bookdisk is no different than any other big job: You just break it into smaller tasks and do them one by one. Before you know it, your book will be done. So, let's look at the steps in the process.

Step 1: Typing in BookDisk

As I indicated, your first task is to type in the program in Listing 1 to generate the machine language. As always, use *RUN*'s Checksum program (found on page 61) to detect any typing errors. The Data statements have been installed as easy-to-read-and-type letters, rather than numbers, to make the work less daunting. When finished, save the program on one of your work disks.

Before continuing, you need to find out two important numbers you'll need to type in when you run Listing 1. The first is the ASCII value your word processor uses to designate carriage returns. The second has to do with the way the word processor saves characters. To determine what numbers you need, check the sidebar on page 22.

That done, you need to format a new disk—your prototype bookdisk. Give it the same name as your book.

You're almost ready to run the source program . . . but not quite. First, you must move Basic up so the BookDisk machine language can load into the convenient section of memory at the bottom of Basic free RAM. To do so, type POKE 44,32:POKE 8192,0 and press the RETURN key.

Now, put your work disk back in the drive, reload Listing 1 and run it. If you've done anything wrong up to this point, you'll be stopped. Otherwise, in about two minutes you'll be prompted to type in those two values you looked up earlier.

After that, you'll be prompted to put your publication disk—the one you just formatted—in the drive. Do so, and follow the screen prompt by pressing S. The drive will work, saving BookDisk to your new disk. Basic's pointers will be restored, and then you can run the program. However, at this point you'll have no files on your publication disk that you can load. To see BookDisk in action, insert one of your present word processing data disks and run the program.

Write your book on a work disk. Little explanation is required for using BookDisk. The eight function ►

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keys, the cursor keys, the BACK-ARROW key and the HOME key are the only ones used. F1 yields a help screen that pretty much tells all. The other function-key options are: F2, load; F3, mark your place; F4, retrieve your place; F5, change the character colors; F6, change the screen color; F7, print; and F8, exit to Basic. CURSOR-UP and -DOWN scroll through the text, while CURSOR-LEFT and -RIGHT jump a whole screen forward or backward. HOME jumps to the top of the text, and BACK-ARROW quits various activities.

Play around with it for a while, then press F8. Once back in Basic, type LIST to see what's there. A single-line program, 10 SYS 2061, is written like Basic to let you load and run BookDisk like any other program.

Step 2: Writing Your Book

Where do you begin? First, decide what you're going to write about. Chances are you have an area of expertise or special interest. Maybe that should be your first project. How-to books are the most straightforward kind.

However, don't limit yourself to nonfiction. Why shouldn't we Commodore authors crank out some short stories or a novel? You've got approximately 30,000 words available on a single-sided 1541-formatted disk, double that if you flip the disk over and use the back side. A 1581 disk can hold more than 130,000 words, enough space to create one mighty long epic poem.

Space limitations prevent me from giving much advice on the actual writing process. There are hundreds of books and articles on that topic. The important thing would-be authors should remember is that the purpose of all writing is to transmit ideas from the writer's head to the reader's. If you know what you want to say, know your audience, and try to hurdle any natural barriers to communication that appear, you'll have done your job well.

You should write your book in chapters, not only to help break your idea into manageable units and make file-handling easier, but as a favor to your readers. It's a big relief to a reader to see a logical sequence of sections, and loading long files can be almost as annoying as reading them. BookDisk lets you fill up memory with a file, so anything your word processor can handle will work. However, files under 70 blocks (about 3000 words) are best.

Copy-editing, the chore of removing errors of form, may inhibit some would-be writers. The practical solution is to get a word-wise friend to read your bookdisk and make suggestions and corrections. And, of course, if you have a spell-checker, use it. They aren't perfect, but they will catch a bunch of typos and dumb misspellings.

Even with the most careful copy-editing, errors will make their insidious way into the final copy, and readers will write and point them out to you. Paper publishers have to wait until the next printing to correct those errors; you can do it immediately, an advantage of electronic publishing.

Step 3: Printing Your Book

Finally, the day comes when you've written all the chapters and it's time to put the files on your publication prototype disk. You can place them on the disk any way you find convenient, with a file copier or by saving them one by one from within your word processor. The important thing is to put them in the order you want them in the table of contents. I'd also highly recommend that you name them with a numerical prefix like this:

1. Dark and Stormy Nights
2. Lost at Sea
3. Johnny's Dream

If your word processor attaches prefixes to filenames and you'd like to remove them, you'll need to use a file utility to rename your files after they're in place on the publication disk. Remember, the limitation of 16 characters per filename (chapter title) applies to BookDisk.

It's highly advisable to put a publication's data file before or after the other files on your disk. In it include the publication date, the author, the company (invent a name—mine is Country Road Press), a foreword, a preface, a brief author's biography, and so on.

Include the following copyright information: the word "Copyright," the year of first publication, and your name—for example, "Copyright 1991 by John Jones." Put this notice in every chapter file on the disk. End the publication data file with the phrases "All Rights Reserved," "Printed in the United States of America" and "First Printing."

This constitutes a valid, if somewhat informal, copyright. To officially register your book, contact the United States Copyright Office, Library of Congress, Washington, D.C. 20559, and ask for Form TX. The cost is $10.

Once you've got the publication disk completed, make a backup copy. Now you can use a disk-copy program to make as many copies of your book as you want.

One last point: People do judge books by their covers. It's fine to use inexpensive disks with plain white sleeves for your copies, and it's no problem if you mail them in generic mailers, but use attractive disk labels. You can use your computer and printer to create them, or you can have a local printing firm make some (they're not expensive). On the labels put the title, the copyright info, your

Numbers You Will Need

If your word processor is listed below, when you are prompted, just type in the numbers next to its name. If it isn't listed, you'll need to do a little investigating.

Start by booting your word processor and typing the line !a! then hit RETURN. Be sure to type it exactly, including the exclamation points.

Now save the line with the filename CR.TEST. Then clear your word processor and type in the simple little file-reader in Listing 2.

Run the file-reader with the disk containing the CR.TEST file in the drive, and the numbers you need will print to the screen. One *caveat*: If your word processor attaches a prefix to filenames, change line 10 to include the prefix.

Word Processor	Carriage Return	Filetype
RUN Script	159	1
VizaWrite	220	1
Speedscript	31	1
The Write Stuff	31	1
BrainPower	186	0

Listing 2. CR.TEST program. (Available on the May/June ReRUN disk.)

```
10 OPEN2,8,2,"-CR.TEST" :REM*34
20 GET#2,A$:IFA$=""THEN20
                        :REM*45
30 A=ASC(A$):IFA<>33THEN20
                       :REM*147
40 GET#2,A$             :REM*118
50 F=1:IFASC(A$)=65THEN F=0
                        :REM*34
60 GET#2,A$             :REM*130
70 GET#2,CR$:CR=ASC(CR$):REM*94
80 PRINT"FILETYPE ="F   :REM*135
90 PRINT"CARRIAGE ="CR  :REM*46
100 CLOSE2              :REM*105
```

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name, and a brief set of instructions (such as "Type LOAD "*",8:RUN; press F1 for help"). At any rate, please, don't send disks with handwritten, scratched out, misaligned labels.

Step 4: Going Public

Your book is written, published and ready to move. Now's the time to send a copy to me, Mark Jordan, in care of *RUN* Magazine, 80 Elm St., Peterborough, NH 03458. With the disk, please include the following on paper: a 50-word (or less) description of the book and your name, address and phone number. After we've received enough bookdisks, we'll select the best entries and determine the winners in the various categories (see the details on page 24). Cash prizes and Commodore equipment and software will be awarded to the winners. In addition, *RUN* will publish a collection of the winning entries and market them as a special BookDisk.

We'll also do a follow-up article listing and perhaps reviewing the more significant works.

Review? But what if the reviewer doesn't like my bookdisk? That, my friend, is one of the hazards of writing. It's also one of the proofs that you're a bona fide author and publisher. And besides, there's truth in the old saw that any review is a good review.

Inspired? I hope so. The computer industry promised us a paperless society. It's high time to start fulfilling that prophecy. Get typing! R

Mark Jordan is RUN's *128 Mode columnist. He teaches high school English in Ligonier, Indiana, and has been writing Commodore programs for years.*

Listing 1. Source.BookDisk program. (Available on the May/June ReRUN disk. To order, call 800-343-0728.)

```
10 TI$="000000":SE=110 :REM*208
20 PRINT CHR$(14)"WAITING:"
                        :REM*130
30 IFPEEK(44)<32THENPRINT"POKE
   44,32:POKE 8192,0 ... THEN R
   ELOAD":STOP          :REM*245
40 ML=2048:DIM D(25)    :REM*209
50 FORT=16TO25:READ D(T):NEXT
                        :REM*111
60 DATA 32,207,,169,255,201,240
   ,208,76,133          :REM*71
70 K=0:READA$:IFA$="@"THEN190
                        :REM*22
80 FORI=0TO1:K=K+1      :REM*84
90 GOSUB140             :REM*167
100 POKE ML,P:ML=ML+1   :REM*172
110 NEXT                :REM*240
120 IFTT$<>TI$THEN SE=SE-1:PRIN
   T"{HOME}{CRSR DN}"SE"{CRSR
   LF} SECONDS{2 SPACEs}":TT$=
   TI$                  :REM*231
130 GOTO70              :REM*11
140 A=ASC(MID$(A$,K,1))-65
                        :REM*249
150 IFA>15THEN A=D(A):B=0:GOTO1
   70                   :REM*128
160 B=ASC(MID$(A$,K+1,1))-65:K=
   K+1                  :REM*16
170 P=A+B*16            :REM*44
180 RETURN              :REM*67
190 INPUT"{SHFT CLR}{SHFT C}ARR
   IAGE RETURN";CR$     :REM*199
200 INPUT"{SHFT F}ILETYPE (0/1)
   ";F$                 :REM*252
210 POKE2905,VAL(CR$):POKE2900,
   VAL(F$)              :REM*109
220 PRINT"{SHFT CLR}{SHFT P}UT
   PUB DISK IN DRIVE AND PRESS
    {SHFT S}"           :REM*153
230 GETA$:IFA$<>"S"THEN230
                        :REM*52
240 OPEN1,8,1,"BOOKDISK 64"
                        :REM*106
250 POKE780,251:POKE251,1:POKE2
   52,8                 :REM*16
260 POKE781,54:POKE782,16:REM*9
270 SYS 65496:CLOSE1    :REM*57
280 POKE44,8            :REM*127
290 END                 :REM*163
300 DATA SLA,IAKA,SOJ,CDAD,GDBD
   ,SS,SCK,LAOI         :REM*230
310 DATA QX,TS,NIBC,XNI,DPR,CKP
   B,NJAO,RKM           :REM*1
320 DATA XKP,TIM,NIOP,RT,OANI,O
   OR,QCN,UAK           :REM*69
330 DATA ST,AKJJ,SIM,JJS,VJJ,SK
   M,JJS,LMIM           :REM*32
340 DATA XBP,QFO,MAQ,DGMA,QML,K
   AQ,FOMA,QMN          :REM*39
350 DATA MAQ,ICKA,QEO,UW,LPV,BB
   W,DBV,BJW            :REM*182
360 DATA FCV,NBW,EBV,NJW,CDV,DB
   W,BOY,KMIA           :REM*92
370 DATA OKEO,RMK,FOR,YPH,IAOK,
   COR,MKDO,RGI         :REM*106
380 DATA LJEI,MJY,BFIA,CKCA,QAK
   ,IAV,MPW,DAKM        :REM*28
390 DATA XGP,GOLJ,XCA,GOMJ,YBF,
   IACK,JBY,IIIA        :REM*154
400 DATA AKS,IDFK,LJJO,BAAL,CAG
   M,MJZ,LJBL,LJV       :REM*29
410 DATA KPAJ,POAG,FKLJ,NIEP,RF
   K,MJNI,FPR,AGNK      :REM*14
420 DATA EPR,ZLJ,NKFP,RZ,MJAG,V
   Z,WMB,VJI            :REM*2
430 DATA WND,VGI,WKB,VKI,WDC,VH
   I,WHF,VLI            :REM*18
440 DATA WFE,VII,WGC,VMI,WIC,QP
   B,MAY,BFIA           :REM*177
450 DATA FKLJ,NIIP,RFK,MJNI,JPR
   ,YID,JANK,JPR        :REM*103
460 DATA WOO,ZMJ,NKIP,RZ,LJY,BF
   IA,YMA,NAY           :REM*101
470 DATA NAIA,TJJ,AKOA,QOB,LKQ,
   EOU,WLP,VJF          :REM*1
480 DATA XGB,TDJ,YCN,UOO,DPR,NK
   DP,RJC,PANI          :REM*98
490 DATA BCX,YBF,IAOO,OOR,NKOO,
   RJC,PANI,OOR         :REM*133
500 DATA QFO,MAY,BFIA,QMN,MAT,S
   NI,JOR,CKCA          :REM*108
510 DATA QGM,UQ,RU,NMIO,RX,KAT,
   SNI,AOR              :REM*134
520 DATA TOP,YZ,JAOK,HOR,XLB,VQ
   ,AJED,VBE            :REM*61
530 DATA AJDB,VLF,AJNA,VBM,AJIC
   ,VLN,ALEC,JCPH       :REM*175
540 DATA YZ,JAJC,PDZ,FKQ,FLJA,Q
   FP,JAFK,FKNI         :REM*27
550 DATA POR,AKS,BJLJ,GOLJ,XIA,
   GOMJ,FKMJ,VAK        :REM*135
560 DATA WEA,FKAJ,WNK,TU,BJLJ,C
   KBA,QGM,UT           :REM*165
570 DATA CAQ,DMU,AGOO,AOR,VQ,XM
   B,NMPO,RW            :REM*157
580 DATA HBCK,DAOP,KOR,NLKO,RV,
   KAX,IAT,SNJ          :REM*159
590 DATA KOR,KMAB,OOQ,JNJA,AGCK
   ,SIB,NLKO,RJG        :REM*157
600 DATA ALMK,GOR,XGA,NJDC,EAY,
   POJA,NJAD,FAIO       :REM*39
610 DATA AOEA,XHO,AGNK,AOR,VKC,
   AJLC,FKLJ,ZOJ        :REM*194
620 DATA FKMJ,ZPJ,AKS,CKS,IOID,
   FKOJ,JOBA,ALCA       :REM*30
630 DATA GMPJ,ZOJ,BLOJ,VQ,WEA,V
   NC,XKO,AKS           :REM*76
640 DATA TNP,BJOJ,OIAO,RAG,TIC,
   ZOJ,TEA,ZPJ          :REM*14
650 DATA QEL,IAT,SNI,AOR,NIBO,R
   AK,SBL,LJGO          :REM*181
660 DATA LJX,CAGO,MJV,UW,CEV,OP
   W,DBV,NPW            :REM*222
670 DATA PAV,LPW,LAMK,AOR,BJOJ,
   OOAO,RY,LDKA         :REM*255
680 DATA QJJ,KANK,BOR,VBA,XMA,I
   EFK,LJNI,EOR         :REM*235
690 DATA FKMJ,NIFO,RIG,VIB,WDA,
   YLD,KAFK,LJNI        :REM*196
700 DATA COR,FKMJ,NIDO,RQ,PLIA,
   AGOK,BOR,QJJ         :REM*31
710 DATA KAIO,AOIB,XIP,YHI,KAMK
   ,AOR,TQ,AMIC         :REM*77
720 DATA ALGA,BJOJ,IMY,OJKA,IBF
   K,OJJG,ICZ,OJAJ      :REM*86
730 DATA CAGO,PJT,SNI,AOR,OOBO,
   RAG,AKS,MIW          :REM*215
740 DATA RCK,SOI,BPR,QIJ,LAQ,AG
   LA,QEO,UW            :REM*20
750 DATA LPOK,BPR,MKU,RV,BBW,PA
   V,BJW,ECV            :REM*173
760 DATA NAW,ADV,PFW,LCY,MMKA,M
   MCP,RW,NNIO          :REM*245
770 DATA IMAO,MAAJ,FACK,SMI,WR,
   OIBP,RMI,UR          :REM*177
780 DATA YGM,KAAM,SW,FMKM,IIAO,
   UX,NOCK,SY           :REM*123
790 DATA HPKA,AGT,OGAK,OAQ,OBLK
   ,AKKA,CKS,IBQ        :REM*128
800 DATA WU,AKS,FKHK,NINP,RFK,I
   KNI,OPR,BLHK         :REM*81
810 DATA VAO,WIA,QCN,UIM,AMAB,X
   CP,EILJ,TCA          :REM*180
820 DATA CKIA,AKCA,QKL,UFK,LJGK
   ,HKEK,IKQ,NLU        :REM*49
830 DATA QAM,UT,SNI,HOR,TKL,NII
   O,RY,GEJA            :REM*191
840 DATA IBNK,BPR,JGHA,ZFK,TMA,
   ZGK,QLF,MAIB         :REM*9
850 DATA NKW,RIE,NGBP,RNI,WR,QB
   A,MAIG,NIW           :REM*78
860 DATA RT,CJQ,CNU,AKS,BLHK,QC
   N,UIM,AMAB           :REM*243
870 DATA XGP,TCB,QCN,UAG,TGA,ZF
   K,TLA,ZGK            :REM*130
```

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DARK AND STORMY NIGHT

```
88Ø DATA QLF,MAT,CMAK,OAQ,OBLK,
    THA,ZFK,QBA          :REM*221
89Ø DATA MAT,SNI,JOR,QLF,MAQ,BP
    LA,AKS,BLHK          :REM*236
9ØØ DATA QCN,UIM,AMAB,XGP,QBP,L
    AQ,DBMA,GOFK         :REM*48
91Ø DATA OOJO,ROK,JOR,AOMA,XMN,
    QLF,MAT,HNAK         :REM*188
92Ø DATA OAQ,OBLK,GOFK,QLF,MAT,
    LOAK,OAQ,OBLK        :REM*15
93Ø DATA AGT,PBQ,CNU,TQ,QCN,UT,
    LJQ,CNU              :REM*253
94Ø DATA AGT,SZ,HKT,IMZ,IKOK,WR
    ,QDB,MAKM            :REM*14
95Ø DATA ABKP,AGIB,FKHK,JGAB,ZH
    K,AJCA,GOIK,AGT      :REM*185
96Ø DATA GAZ,FKT,LAZ,GKT,UAK,OA
    Z,LPEI,MPQ           :REM*122
97Ø DATA LFMA,FKLP,EKMP,QOB,LKG
    O,LPX,CAGO,MPII      :REM*189
98Ø DATA ABHP,GOFK,FKFK,VFB,XFO
    ,OOGO,RQ,JNJA        :REM*197
99Ø DATA OMGO,RQ,EOU,WLP,YFO,MA
    EK,GKGK,FKIB         :REM*229
1ØØØ DATA YW,UAK,SMI,CPR,TCA,CK
     IA,QKL,UT           :REM*1Ø9
1Ø1Ø DATA DACK,OBAK,OAQ,NLU,QAM
     ,UT,SZ,OJT          :REM*1Ø8
1Ø2Ø DATA IMZ,PJCK,CAQ,GMU,AKS,
     QFN,MAX,FDKI        :REM*Ø
1Ø3Ø DATA VCC,XGP,QFN,MAX,LCKI,
     VS,WMO,VCC          :REM*2Ø1
1Ø4Ø DATA WFA,BJOJ,IMX,NOAM,ABW
     ,IAT,AOBJ,OJIM      :REM*126
1Ø5Ø DATA YHK,MAIB,FKOJ,JGAB,ZO
     J,AJCA,GOPJ,OOCP    :REM*249
1Ø6Ø DATA RY,IIMA,CKBA,QGM,UT,C
     AQ,DMU,OMCP         :REM*246
1Ø7Ø DATA ROM,CPR,AGQ,RU,KKY,HL
     U,TDD,ZLJ           :REM*38
1Ø8Ø DATA TAB,ZMJ,AGOK,OOR,NLBC
     ,ABQ,CNU,THC        :REM*188
1Ø9Ø DATA AKOA,QOB,LKAK,SNK,NPR
     ,ZHK,NKOP,RZ        :REM*223
11ØØ DATA IKBL,HKQ,CNU,IMAM,ABX
     ,GPAG,TOK,AKOA      :REM*19Ø
111Ø DATA QOB,LKT,EACK,EAAK,HAQ
     ,KLU,TS,ZLP         :REM*181
112Ø DATA ZMP,ZNP,GMMP,QNL,UQ,A
     MU,CKEA,QV          :REM*184
113Ø DATA UAL,FAQ,HLU,ABPA,TDE,
     AKOA,QOB,LKQ        :REM*2
114Ø DATA EOU,WLP,YIM,NAQ,MNMA,
     QDN,NAQ,DBOA        :REM*244
115Ø DATA FKNP,XEA,TMB,ZNP,AKS,
     BLLJ,IMV,UW         :REM*173
116Ø DATA HGV,OPAL,LDV,NPAL,CBV
     ,AEAL,JAV,QAL       :REM*223
117Ø DATA MAJA,AEY,NHNA,JAAI,YN
     H,NAT,QZ,OPQ        :REM*253
118Ø DATA CNU,QEO,UV,PFW,PDAM,K
     DAJ,NMFK,OPV        :REM*4Ø
119Ø DATA QW,NAV,NCW,JAAM,CEAJ,
     PLT,NCQ,CNU         :REM*36
12ØØ DATA TNA,QCN,UQ,CNU,GMNP,X
     FA,CKKA,QFN         :REM*43
121Ø DATA NAQ,DBOA,BLLJ,VQ,XBA,
     IMIB,IJFG,LJAJ      :REM*74
122Ø DATA CAGO,MJZ,LJY,AFNA,TEA
     ,QDM,UQ,MMU         :REM*25Ø
123Ø DATA YLE,IACK,FAT,NAQ,CNU,
     AOIA,XDC,CKEC       :REM*68
124Ø DATA TQ,QCN,UKM,XIP,TBC,AK
     OA,QOB,LKFK         :REM*21
125Ø DATA LPW,FAJG,ADQ,CNU,FKMP
     ,JGAD,QCN,UCK       :REM*117
126Ø DATA IAKM,XBN,GOMP,FKMP,VK
     A,XGA,GOLP,TS       :REM*12Ø
127Ø DATA ZMP,AGCK,KAT,QQ,CNU,K
     MX,IPAG,ECKD        :REM*165
128Ø DATA KCX,BEHE,FEQ,SDJ,CBHJ
     ,QCM,PEPE,LEEM      :REM*127
129Ø DATA JEDF,LEQ,QQ,QQ,QQ,QQ,
     QGM,JEY             :REM*1Ø9
13ØØ DATA FEKD,SDB,FAQ,XCF,JEOE
     ,EFFE,CFQ,AFCF      :REM*17Ø
131Ø DATA PECE,YFE,NEDF,QNC,NCQ
     ,XCF,FEDF,DFQ       :REM*44
132Ø DATA EFPE,QDE,PEOE,EFJE,OE
     FF,FEOC,QS,DBHJ     :REM*74
133Ø DATA MMPE,BEEE,JEOE,HEOC,O
     COC,QQ,QQ,QQ        :REM*121
134Ø DATA QQ,QQ,QQ,QQ,QQ,QDC,HN
     PE,CFEE             :REM*156
135Ø DATA DFOC,OCQ,QQ,QQ,SDB,FA
     BM,CFFE,QJF         :REM*21Ø
136Ø DATA PEFF,QDF,FFCF,FEPD,QJ
     N,PCOM,LJS,DBFA     :REM*156
137Ø DATA XCF,FEDF,DFQ,PFQ,EFPE
     ,QFE,DFDE,BEAF      :REM*166
138Ø DATA FES,PBEN,BECE,YFE,QPE
     ,GEQ,DMPE,OEEF      :REM*94
139Ø DATA FEOE,EFDF,QLJ,SPB,DMC
     F,DFCF,NCCN,FEEF    :REM*217
14ØØ DATA FFCF,OEQ,YPE,BEEE,DFQ
     ,SPB,BMCF,CFPE      :REM*249
141Ø DATA HFQ,ICPF,JCQ,FEDF,DEB
     E,AFFE,DFQ,SLJ      :REM*174
142Ø DATA CBQ,QQ,QQ,IMQ,FEQ,YQ,
     AFQ,QQ              :REM*195
143Ø DATA QQ,QS,FAQ,QHN,PECF,EE
     Q,DEPE,FFOE         :REM*112
144Ø DATA EFQ,QQ,QQ,QS,QKC,DMFF
     ,CFDF,PECF          :REM*23Ø
145Ø DATA NCFF,AFPC,EEPE,HFOE,Q
     Q,SQ,QDF,DECF       :REM*183
146Ø DATA PEY,YDF,QEF,FEIF,EFQ,
     QQ,QS,QKC           :REM*253
147Ø DATA DMFF,CFDF,PECF,NCY,FE
     GE,EFPC,CFEF,QQ     :REM*118
148Ø DATA SQ,QKE,FFNE,AFDF,QDF,
     DECF,FEFE,OEDF      :REM*37
149Ø DATA QQ,QS,QKC,IMPE,NEFE,Q
     EF,PEQ,DFEF         :REM*129
15ØØ DATA BECF,EFQ,QQ,SLJ,QGM,B
     DQ,IMFE,YAF         :REM*181
151Ø DATA QQ,QQ,QQ,QQ,QQ,SQ,GMC
     D,QMM               :REM*12Ø
152Ø DATA PEBE,EEQ,DEIE,BEAF,EF
     FE,CFQ,QS,QGM       :REM*145
153Ø DATA DDQ,DNFE,EFQ,CEPE,PEL
     E,NEBE,CFLE,QQ      :REM*237
154Ø DATA SQ,GMED,QHM,FEEF,QCE,
     PEPE,LENE,BECF      :REM*129
155Ø DATA LEQ,QS,QGM,FDPC,GDQ,D
     MJF,DEY,FEQ         :REM*18Ø
156Ø DATA DEPE,YPE,CFQ,SQ,GMHD,
     QX,CFJE,OEEF        :REM*246
157Ø DATA QDE,IEBE,AFEF,FECF,QS
     ,QGM,IDQ,FMIF       :REM*238
158Ø DATA JEEF,QAF,CFPE,HECF,BE
     NE,QQ,SFA,NCNC      :REM*3
159Ø DATA XCF,FEDF,DFQ,BEOE,JFQ
     ,LEFE,JFNC,NCNC     :REM*66
16ØØ DATA SAJ,FAMB,PJMJ,OBPB,OJ
     BI,FJGJ,HJIJ,JJKJ   :REM*119
161Ø DATA LJS,MPS,@       :REM*24
```

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Scaling Metric

Gallons? Liters? Miles? Kilometers? Celsius? Fahrenheit?! This program will help you adjust to the metric world.

By JEFF KOESTER

Steadily, albeit gradually, the metric system is becoming part of life in the U.S. Perhaps you use it in school, at work or at play. Soft drinks are now sold by the liter and food ingredients are listed by grams. If you've traveled to another country, you've surely encountered it. So how far is 20 kilometers, anyway?

Find out with Metric Converter, a Basic program that converts temperature, mass, length and volume from metric to U.S., and vice versa. Whether you're doing your physics homework, purchasing widgets from a company abroad or running in a five-kilometer race, it will come in handy. Temperature conversions are between Fahrenheit and Celsius; mass (weight) between pounds and kilograms, and ounces and grams; length between miles and kilometers, and inches and centimeters; and volume between gallons and liters, and fluid ounces and milliliters.

Type in Metric Converter from Listing 1, using *RUN*'s Checksum program on page 61 to detect any typing errors, then save the program to disk. When you run it, just follow the prompts. After a conversion, when asked if you want to return to the Main menu, enter Y to do a different type of conversion. To do another conversion of the same type, enter N, then RUN at the Ready prompt.

Not only will Metric Converter help you measure up in specific situations, it can also help you get in step with the rest of the world. R

Jeff Koester, a high school senior, has been programming in Basic for five years and has recently taken up machine language and Pascal.

Listing 1. Metric Converter program. (Available on the May/June ReRUN disk. To order, call 800-343-0728.)

```
10 REM THE METRIC SYSTEM BY JEF
   F KOESTER              :REM*138
20 POKE 53280,0:POKE53281,0
                          :REM*68
30 PRINT"{SHFT CLR}{CTRL 2}"
                          :REM*113
40 PRINT"{2 CRSR DNs}**THE METR
   IC CONVERTER**{CTRL 0}"
                          :REM*153
50 PRINT"{2 CRSR DNs}1 TEMPERAT
   URE CONVERSION"        :REM*78
60 PRINT"{CRSR DN}2 MASS CONVER
   SION"                  :REM*228
70 PRINT"{CRSR DN}3 LENGTH CONV
   ERSION"                :REM*17
80 PRINT"{CRSR DN}4 VOLUME CONV
   ERSION"                :REM*186
90 INPUT"{CRSR DN}CHOOSE TYPE O
   F CONVERSION";A        :REM*184
100 IFA=1 THENGOTO150     :REM*124
110 IFA=2 THENGOTO310     :REM*96
120 IFA=3 THENGOTO600     :REM*133
130 IFA=4 THENGOTO910     :REM*186
140 IFA<1 OR A>4 THENGOTO90
                          :REM*208
150 PRINT"{SHFT CLR}":PRINT"TEM
   PERATURE CONVERSION"
                          :REM*111
160 PRINT"{2 CRSR DNs}1 FAHRENH
   EIT TO CELSIUS"        :REM*254
170 PRINT"{CRSR DN}2 CELSIUS TO
    FAHRENHEIT"           :REM*192
180 INPUT"{CRSR DN}CHOOSE ONE";
   A                      :REM*121
190 IFA=1THENGOTO210      :REM*187
```

It's easy to "measure up" with Metric Converter.

```
200 IFA=2 THENGOTO260     :REM*229
210 PRINT"{CRSR DN}F TO C"
                          :REM*102
220 INPUT"{CRSR DN}INPUT TEMPER
   ATURE";T               :REM*57
230 PRINT"{CRSR DN}THE CORRESPO
   NDING TEMPERATURE IS "
                          :REM*50
240 PRINT INT ((((T-32)*5/9)+.0
   5)*10)/10"C"           :REM*147
250 GOTO 1220             :REM*55
260 PRINT"{CRSR DN}C TO F"
                          :REM*167
270 INPUT"{CRSR DN}INPUT TEMPER
   ATURE";T               :REM*235
280 PRINT"{CRSR DN}THE CORRESPO
   NDING TEMPERATURE IS "
                          :REM*0
290 PRINT INT ((((T*9/5)+32)+.0
   5)*10)/10"F"           :REM*125
300 GOTO1220              :REM*97
310 PRINT"{SHFT CLR}":PRINT"MAS
   S CONVERSION"          :REM*87
320 PRINT"{2 CRSR DNs}1 POUND T
   O KILOGRAMS"           :REM*45
330 PRINT"{CRSR DN}2 KILOGRAM T
   O POUNDS"              :REM*251
340 PRINT"{CRSR DN}3 OUNCE TO G
   RAMS"                  :REM*84
350 PRINT"{CRSR DN}4 GRAM TO OU
   NCES"                  :REM*200
360 INPUT"{CRSR DN}CHOOSE ONE";
   A                      :REM*44
370 IFA=1 THENGOTO420     :REM*110
380 IFA=2 THENGOTO480     :REM*172
390 IFA=3 THENGOTO520     :REM*177
400 IFA=4 THENGOTO560     :REM*223
410 IFA<1 OR A>4THENGOTO360
                          :REM*112
420 PRINT"{CRSR DN}POUND TO KIL
   OGRAMS"                :REM*15
430 GOSUB440:GOSUB 470:GOTO450
                          :REM*54
440 INPUT"{CRSR DN}INPUT MASS";
   M:RETURN               :REM*3
450 PRINT INT((M*.454+.05)*10)/
   10" KG"                :REM*198
460 GOTO 1220             :REM*0
```


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```
47Ø PRINT"{CRSR DN}THE CORRESPO
    NDING MASS IS ":RETURN
                          :REM*247
48Ø PRINT"{CRSR DN}KILOGRAM TO
    POUNDS"               :REM*52
49Ø GOSUB44Ø:GOSUB47Ø   :REM*114
5ØØ PRINT INT ((M/.454+.Ø5)*1Ø)
    /1Ø" LBS"             :REM*57
51Ø GOTO 122Ø             :REM*5Ø
52Ø PRINT"{CRSR DN}OUNCE TO GRA
    MS"                   :REM*149
53Ø GOSUB44Ø:GOSUB47Ø   :REM*17Ø
54Ø PRINT INT ((M*28.4+.Ø5)*1Ø)
    /1Ø" G"               :REM*96
55Ø GOTO 122Ø             :REM*9Ø
56Ø PRINT"{CRSR DN}GRAM TO OUNC
    ES"                   :REM*64
57Ø GOSUB44Ø:GOSUB47Ø   :REM*194
58Ø PRINT INT ((M/28.4+.Ø5)*1Ø)
    /1Ø" OZ"              :REM*3Ø
59Ø GOTO 122Ø             :REM*13Ø
6ØØ PRINT"{SHFT CLR}"     :REM*115
61Ø PRINT"{CRSR DN}LENGTH CONVE
    RSION"                :REM*183
62Ø PRINT"{CRSR DN}1 MILE TO KI
    LOMETERS"             :REM*47
63Ø PRINT"{CRSR DN}2 KILOMETER
    TO MILES"             :REM*197
64Ø PRINT"{CRSR DN}3 INCH TO CE
    NTIMETERS"            :REM*13
65Ø PRINT"{CRSR DN}4 CENTIMETER
     TO INCHES"           :REM*16Ø
66Ø INPUT"{CRSR DN}CHOOSE ONE";
    A                     :REM*31
67Ø IFA=1THENGOTO72Ø      :REM*174
68Ø IFA=2THENGOTO79Ø      :REM*23
69Ø IFA=3THENGOTO83Ø      :REM*251
7ØØ IFA=4THENGOTO87Ø      :REM*1Ø
71Ø IFA<1 OR >4 THEN GOTO 79Ø
                          :REM*18Ø
72Ø PRINT"{CRSR DN}MILE TO KILO
    METERS"               :REM*96
73Ø GOSUB 74Ø:GOSUB78Ø:GOTO76Ø
                          :REM*181
74Ø INPUT"{CRSR DN}INPUT DISTAN
    CE";L:RETURN          :REM*75
75Ø GOSUB78Ø              :REM*84
76Ø PRINT INT ((L*1.61+.ØØ5)*1Ø
    Ø)/1ØØ " KM"          :REM*1ØØ
77Ø GOTO 122Ø             :REM*61
78Ø PRINT"{CRSR DN}THE CORRESPO
    NDING LENGTH IS ";:RETURN
                          :REM*224
79Ø PRINT"{CRSR DN}KILOMETER TO
     MILES"               :REM*5Ø
8ØØ GOSUB74Ø:GOSUB78Ø     :REM*214
81Ø PRINT INT ((L/1.61+.ØØ5)*1Ø
    Ø)/1ØØ" MILES"        :REM*181
82Ø GOTO 122Ø             :REM*1Ø7
83Ø PRINT"{CRSR DN}INCH TO CENT
    IMETERS"              :REM*159
84Ø GOSUB74Ø:GOSUB78Ø     :REM*15
85Ø PRINT INT ((L*2.54+.ØØ5)*1Ø
    Ø)/1ØØ" CM"           :REM*197
86Ø GOTO122Ø              :REM*147
87Ø PRINT"{CRSR DN}CENTIMETER T
    O INCHES"             :REM*89
88Ø GOSUB74Ø:GOSUB78Ø     :REM*39
89Ø PRINT INT ((L/2.54+.ØØ5)*1Ø
    Ø)/1ØØ " INCHES"      :REM*143
9ØØ GOTO 122Ø             :REM*187
91Ø PRINT"{SHFT CLR}"     :REM*17Ø
92Ø PRINT"{CRSR DN}VOLUME CONVE
    RSION"                :REM*2Ø2
93Ø PRINT"{CRSR DN}1 GALLON TO
    LITERS"               :REM*249
94Ø PRINT"{CRSR DN}2 LITER TO G
    ALLON"                :REM*165
95Ø PRINT"{CRSR DN}3 FLUID OUNC
    E TO MILLILITERS"     :REM*133
96Ø PRINT"{CRSR DN}4 MILLILITER
     TO FLUID OUNCES"     :REM*2
97Ø INPUT"{CRSR DN}CHOOSE ONE";
    A                     :REM*84
98Ø IFA=1THENGOTO1Ø3Ø     :REM*162
99Ø IFA=2THENGOTO11ØØ     :REM*165
1ØØØ IFA=3THENGOTO114Ø    :REM*247
1Ø1Ø IFA=4THENGOTO118Ø    :REM*Ø
1Ø2Ø IFA<1 OR A>4 THENGOTO 97Ø
                          :REM*37
1Ø3Ø PRINT"{CRSR DN}GALLON TO L
    ITERS"                :REM*169
1Ø4Ø GOSUB1Ø5Ø:GOTO1Ø6Ø:REM*193
1Ø5Ø INPUT"{CRSR DN}INPUT VOLUM
    E";V:RETURN           :REM*81
1Ø6Ø GOSUB1Ø9Ø             :REM*112
1Ø7Ø PRINT INT((V*3.78+.ØØ5)*1Ø
    Ø)/1ØØ" L"            :REM*83
1Ø8Ø GOTO 122Ø            :REM*118
1Ø9Ø PRINT"{CRSR DN}THE CORRESP
    ONDING VOLUME IS ";:RETURN
                          :REM*22Ø
11ØØ PRINT"{CRSR DN}LITER TO GA
    LLONS"                :REM*161
111Ø GOSUB1Ø5Ø:GOSUB1Ø9Ø:REM*7Ø
112Ø PRINT INT((V/3.78+.ØØ5)*1Ø
    Ø)/1ØØ" GAL."         :REM*14Ø
113Ø GOTO 122Ø            :REM*164
114Ø PRINT"{CRSR DN}FLUID OUNCE
     TO MILLILITERS"      :REM*45
115Ø GOSUB1Ø5Ø:GOSUB1Ø9Ø
                          :REM*11Ø
116Ø PRINT INT((V*29.6+.Ø5)*1Ø)
    /1Ø" ML"              :REM*1Ø
117Ø GOTO 122Ø            :REM*2Ø4
118Ø PRINT"{CRSR DN}MILLILITER
    TO FLUID OUNCES"      :REM*191
119Ø GOSUB1Ø5Ø:GOSUB1Ø9Ø
                          :REM*182
12ØØ PRINT INT((V/29.6+.Ø5)*1Ø)
    /1Ø"FL OZ"            :REM*122
121Ø GOTO 122Ø            :REM*244
122Ø INPUT"{CRSR DN}RETURN TO M
    AIN MENU(Y/N)";A$     :REM*95
123Ø IFA$="Y"THEN GOTO 1Ø
                          :REM*218
124Ø IFA$<>"Y"THEN END    :REM*167
```

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Bomb Squad

Find the keys and disarm the bomb in this a-maze-ing race against time.

By ROBERT COOK

A bomb in the outer wall of a building will explode in three minutes, and only *you* can prevent it. It's your job to retrieve five keys from various locations in the building's maze of hallways, then find your way to the bomb and disarm it. There's no time to lose. Are you ready? Then plug your joystick into port 2.

As you pick up each key by moving your game token over it, it enters one of the five keyholes in the title line at the top of the screen. This lets you know at a glance how many keys remain in the maze for you to retrieve.

When you've collected all five keys, move the token to the light-green bomb in the dark-green wall and push the joystick in the bomb's direction to disarm it. The all-clear siren will annouce your success.

Remember, you have only three minutes to gather the five keys and get to the bomb. Glance at the timer in the title line to see how much time you have remaining. And try to stay calm.

Three grenades are also hidden within the maze. You can use these to break through an inner wall when you can't find a clear path to a key or to the bomb. To blast through a wall, push the joystick in the direction of the wall you want to demolish and press the fire button. Check the title line to see how many grenades you have available.

Four Degrees of Tension

Bomb Squad offers four challenging levels of play. The difference between them is the size of the window through which you view the maze. The largest window is 38 columns wide by 22 rows high, the smallest is 10 columns by 6 rows. The whole maze is 55 columns by 35 rows, so even the largest window doesn't reveal all of it at once.

As you move your token through the halls, the maze will scroll horizontally and vertically through the window for a full view. You'll find the higher levels easier to play if you learn the layout of the maze by playing at lower levels first.

At the end of each game, the level of the maze and the high score for that level (the greatest amount of time left on the timer) will be displayed. If you've achieved a new high score, it will be highlighted in white; otherwise it will appear highlighted in light green. Choosing a new maze resets the high scores for all four levels to zero.

The program in Listing 1 is a Basic loader that creates Bomb Squad's machine language code. Type in Listing 1, using *RUN*'s Checksum on page 61 to catch any typing errors, and save it to disk before running it. Then, get out there and do something heroic, and *please* hurry: Time is running out. R

Robert Cook is a draftsman and printed circuit board designer who's been programming for years.

Listing 1. Bomb Squad program. (Available on the May/June ReRUN disk. To order, call 800-343-0728.)

```
Ø REM THIS LIST 1 CREATES (AND
  SHOULD NOT BE CALLED) BOMB.ML
                          :REM*8Ø
5 OPEN 8,8,8,"BOMB.ML,P,W"
                          :REM*2Ø5
6 CT=Ø:PRINT"{SHFT CLR}":REM*56
1Ø READ A$:IF A$="-1" THEN CLOS
   E8:PRINT:PRINT"ALL DONE!":EN
   D                      :REM*129
12 PRINT"{HOME}READING LINE "+S
   TR$(CT):CT=CT+1        :REM*141
15 IF LEN(A$)<62 THEN 55
                          :REM*254
2Ø B$=MID$(A$,1,2Ø)+MID$(A$,22,
   2Ø)+MID$(A$,43,2Ø)     :REM*242
25 FOR I=1 TO 3Ø          :REM*181
3Ø C$=MID$(B$,(I*2)-1,2):H$=LEF
   T$(C$,1):L$=RIGHT$(C$,1)
                          :REM*2Ø9
35 H=VAL(H$):IF H$>"9" THEN H=A
   SC(H$)-55              :REM*85
4Ø L=VAL(L$):IF L$>"9" THEN L=A
   SC(L$)-55              :REM*136
45 BY=H*16+L:PRINT#8,CHR$(BY);
                          :REM*67
5Ø NEXT:GOTO 1Ø           :REM*115
55 IF LEN(A$)<21 THEN B$=A$:GOT
   O 7Ø                   :REM*184
6Ø IF LEN(A$)<42 THEN B$=LEFT$(
   A$,2Ø)+RIGHT$(A$,(LEN(A$)-21
   )):GOTO 7Ø             :REM*176
65 B$=LEFT$(A$,2Ø)+MID$(A$,22,2
   Ø)+RIGHT$(A$,LEN(A$)-42)
                          :REM*14Ø
7Ø FOR I=1 TO LEN(B$)/2:REM*221
75 C$=MID$(B$,(I*2)-1,2):H$=LEF
   T$(C$,1):L$=RIGHT$(C$,1)
                          :REM*14Ø
8Ø H=VAL(H$):IF H$>"9" THEN H=A
   SC(H$)-55              :REM*56
85 L=VAL(L$):IF L$>"9" THEN L=A
   SC(L$)-55              :REM*84
9Ø BY=H*16+L:PRINT#8,CHR$(BY);
                          :REM*148
95 NEXT:GOTO 1Ø           :REM*16Ø
1ØØ REM HEX DATA FOR BOMB.ML
                          :REM*7Ø
1Ø1 DATA Ø1Ø8131340ØØ9E2Ø323Ø*3
   73Ø3A8F2Ø56332E393Ø*ØØØØØA
   9932ØD2FFA9ØØ          :REM*254
1Ø2 DATA 8DØEDC8558855AA94Ø85*5
   9A9D8855BA9338Ø1A2*Ø9AØØ12
   ØECA3A93785Ø1          :REM*142
1Ø3 DATA A9Ø18DØEDCA2ØØBD3F11*9
   DØØ38E8EØFØDØF5A2ØØ*BD2F129
   D8Ø39E8EØ7ØDØ          :REM*154
1Ø4 DATA F5AD18DØ29FØØ9ØE8D18*D
   ØA9ØØ85BFAØ182Ø45ØE*A9ØF8D1
   8D4A9ØE8D2ØDØ          :REM*188
1Ø5 DATA A9ØØ8D21DØAØFAA9AØ99*F
   FØ399F9Ø499F3Ø599ED*Ø6A9ØE9
   9FFD799F9D899          :REM*116
1Ø6 DATA F3D999EDDA88DØE1A9ØD*8
```

RUN it right: **C-64; joystick**

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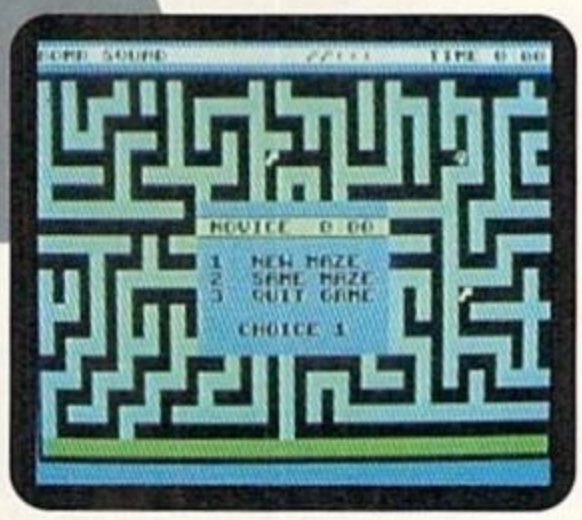

With four levels of play, this game is sure to be a challenge.

```
    5C4AØØØB9B7ØFFØØ62Ø*D2FFC8D
    ØF5A91185D3AØ        :REM*2Ø2
1Ø7 DATA ØØB9E4ØFFØØE2ØD2FFC9*Ø
    DDØØ4A9ØF85D3C8DØED*2ØF8ØEA
    9ØØ85C6A9Ø185        :REM*2Ø
1Ø8 DATA ABA93585Ø22ØØFØFA6AB*C
    A8AØAØA85C2ØA85C3A6*AB86Ø21
    8A5Ø269ØB85Ø2        :REM*163
1Ø9 DATA CADØF6AABDØ3118DCFØB*B
    DØ4118DFFØBBDØ5118D*65ØCBDØ
    6118D69ØCBDØ7        :REM*182
11Ø DATA 118D6DØCBDØ8118D71ØC*B
    DØ9118D5BØCBDØA118D*A8ØCBDØ
    B1185B4BDØC11        :REM*161
111 DATA 85B5BDØD1185F7BDØE11*8
    5F8AØØØADA8ØC85Ø2A9*EC91F7A
    9E2C891F7C4Ø2        :REM*236
112 DATA DØF9C8A9FB91F7AE5BØC*E
    8DØ14AØØØA96191F7C8*A92Ø91F
    7C4Ø2DØF7C8A9        :REM*123
113 DATA E191F718A5F7692885F7*9
    ØØ2E6F8CADØDEAØØØA9*FC91F7A
    962C891F7C4Ø2        :REM*1Ø
114 DATA DØF9C8A9FE91F7A98Ø8D*Ø
    ED48DØFD48D12D4A5BF*FØØ34CD
    CØAAØØFA93Ø99        :REM*76
115 DATA 631Ø881ØF8AØAFA9EØ99*F
    F6F99AE7Ø995D7199ØC*7299BB7
    2996A73991974        :REM*86
116 DATA 99C87499777599267699*D
    57688DØDAA9FE8DØØ7Ø*A9FC8D3
    67ØA9FB8DBC77        :REM*36
117 DATA A9EC8D8477AØ77998577*8
    81ØFAA221A93785F7A9*7Ø85F8A
    Ø35A9AØ91F788        :REM*11
118 DATA DØFB18A5F7693785F79Ø*Ø
    .2E6F8CADØE9A9C285A9*A97385A
    AA9Ø185BØ85B2        :REM*155
119 DATA A93785B185B3AD1BD429*Ø
    385Ø2AAEØØ1FØ2ØEØØ2*FØ1C18A
    5A975BØ85FBA5        :REM*228
12Ø DATA AA69ØØ85FCA5FB75BØ85*F
    9A5FC69ØØ85FA4C66ØA*38A5A9F
    5BØ85FBA5AAE9        :REM*152
121 DATA ØØ85FCA5FBF5BØ85F9A5*F
    CE9ØØ85FAAØØØB1F9C9*AØDØ18B
    1FBC9EØFØ128A        :REM*1Ø8
122 DATA 91F9A92Ø91FBA5F985A9*A
    5FA85AA4C21ØAE8EØØ4*9ØØ2A2Ø
    ØE4Ø2DØ98B1A9        :REM*169
123 DATA AAA92Ø91A9EØØ4BØ4ØEØ*Ø
    ØFØ2ØEØØ3FØ1C18A5A9*75BØ85A
    9A5AA69ØØ85AA        :REM*11
124 DATA A5A975BØ85A9A5AA69ØØ*8
    5AA4C21ØA38A5A9F5BØ*85A9A5A
    AE9ØØ85AAA5A9        :REM*61
125 DATA F5BØ85A9A5AAE9ØØ85AA*4
    C21ØAA2ØØAØØØBD2B1Ø*85F7BD3
    31Ø85F8A91B91        :REM*29
126 DATA F7E8EØØ5DØEDBD2B1Ø85*F
    7BD331Ø85F8A91C91F7*E8EØØ8D
    ØEDA5BFDØ52AØ        :REM*35
127 DATA ØØAD1BD485F7AD1BD429*Ø
    718697Ø85F8B1F7C9EØ*DØE938A
    5F7E93785F9A5        :REM*185
128 DATA F8E9ØØ85FAB1F9C9AØFØ*D
    6AØ36B1F9C9AØFØCEAØ*38B1F9C
    9AØFØC6AØ6EB1        :REM*71
129 DATA F9C9AØFØBEAØØØA91D91*F
    7A5F78D3B1ØA5F88D3F*1ØA9Ø08
    D3870859F859E        :REM*15
13Ø DATA 859C859BA93885BØA97Ø*8
    5B1A9ØØ85F9A97Ø85FA*A9ØØ85F
    785F84C55ØC2Ø        :REM*192
131 DATA 2EØFA59CFØØ34C27ØDAØ*2
    Ø2ØEFØEA91Ø8DØ4D4A9*ØØ8DØBD
    4ADØØDC291FC9        :REM*99
132 DATA ØF9Ø18C917FØ1DC91BFØ*3
    2C91DFØ45C91EF05A2Ø*E1FFDØC
    94C27ØDA69BFØ        :REM*142
133 DATA C218691Ø1ØDFA9Ø12ØB4*Ø
    DDØ59A5F7C92DFØ56A5*B41Ø52E
    6F7A9Ø185Ø2DØ        :REM*16
134 DATA 5AA9Ø12ØC6ØDDØ4ØA5F7*F
    Ø43A5B43Ø3FC6F7A9Ø1*85Ø2DØ5
    3A9372ØB4ØDDØ        :REM*115
135 DATA 29A5F8C91FFØ2EA5B51Ø*2
    AE6F8A93785Ø2DØ2AA9*372ØC6Ø
    DDØ1ØA5F8FØ1B        :REM*226
136 DATA A5B53Ø17C6F8A93785Ø2*D
    Ø234C82ØBE6B4DØ29C6*B4DØ25E
    6B5DØ21C6B5DØ        :REM*123
137 DATA 1D18A5F965Ø285F9A5FA*6
    9ØØ85FA4C55ØC38A5F9*E5Ø285F
    9A5FAE9ØØ85FA        :REM*1ØØ
138 DATA A9ØA8D18D4A2Ø6A5F985*F
    BA5FA85FCA95185FDA9*Ø485FEA
    95185BDA9D885        :REM*76
139 DATA BEAØØØB1FB91FDC9EØ9Ø*Ø
    4A9Ø5DØ22C9AØDØØ4A9*Ø3DØ1AC
    91DDØØ4A9ØDDØ        :REM*181
14Ø DATA 12C91CDØØ4A9ØADØØAC9*1
    BDØØ4A9Ø1DØØ2A9Ø791*BDC8CØØ
    ADØCB18A5FB69        :REM*137
141 DATA 3785FBA5FC69ØØ85FCA5*F
    D692885FDA5FE69ØØ85*FEA5BD6
    92885BDA5BE69        :REM*148
142 DATA ØØ85BECADØA1A59EC9Ø6*F
    ØØ8A9ØF8D18D44C82ØB*2Ø43ØE2
    ØA4ØEAØØØ2ØEF        :REM*55
143 DATA ØEA5C2AABD631ØCD23Ø4*9
    Ø1AFØØ2DØ2CBD651ØCD*25Ø49ØØ
    EFØØ2DØ2ØBD66        :REM*165
144 DATA 1ØCD26Ø49ØØ2BØ16AD23*Ø
    49D631ØAD25Ø49D651Ø*AD26Ø49
    D661ØA9Ø185C4        :REM*53
145 DATA A92ØAØØØ91BØB93B1Ø85*F
    7B93F1Ø85F8A91D91F7*A69FFØ1
    1BD3B1Ø85F7BD        :REM*75
146 DATA 3F1Ø85F8A9AØ91F7CADØ*E
    FB9731ØFØØC2ØD2FFC9*ØDDØØ28
    5D3C8DØEFA6C3        :REM*69
147 DATA AØØØBD431Ø999EØ5E8C8*C
    ØØ8DØF4A6C2AØØØBD63*1Ø99A6Ø
    5E8C8CØØ4DØF4        :REM*155
148 DATA A9BA8DA7Ø5A5C4A2ØE9D*9
    CD9CADØFAA9ØD85C42Ø*F8ØEA9Ø
    Ø85C6A9Ø185AB        :REM*236
149 DATA A93485Ø22ØØFØFC6ABA5*A
    B85BFC9Ø2FØØ34C68Ø8*6Ø85Ø21
    8A5BØ65Ø285B2        :REM*54
15Ø DATA A5B169ØØ85B34CD5ØD85*Ø
    238A5BØE5Ø285B2A5B1*E9ØØ85B
    3B1B2EØØØDØ22        :REM*62
151 DATA C91BFØ3EC91CFØ48C91D*F
    Ø52C92ØFØØ16ØA92Ø91*BØA5B28
    5BØA5B385B1A9        :REM*194
152 DATA ØØ91BØ6ØC9AØDØEA2Ø82*Ø
    EA69BA9AØ9DØEØ4E69F*A69FA5B
    29D3B1ØA5B39D        :REM*114
153 DATA 3F1ØC69B1ØCF2Ø4EØEE6*9
    EA69EA93D9D14Ø4DØC1*2Ø68ØEE
    69BA69BA93C9D        :REM*222
154 DATA ØEØ4DØB3A59EC9Ø5DØAC*E
    69EDØA9AØØDA9ØØ99ØØ*D4881ØF
    86ØA9498DØ6D4        :REM*199
155 DATA A9ØA8DØ5D4A9118DØ4D4*A
    9328DØ1D4A9ØØ8DØØD4*6ØA9FØ8
    DØ6D4A9ØA8DØ5        :REM*122
156 DATA D4A9118DØ4D4A9238DØ1*D
    4A9218DØØD46ØA92Ø8D*Ø6D4A9Ø
    A8DØ5D4A9818D        :REM*98
157 DATA Ø4D4A9128DØ1D4A9ØØ8D*Ø
    ØD42ØEFØEA98Ø8DØ4D4*6ØAØØØB
    9Ø8119ØØD499        :REM*124
158 DATA ØØD7C8CØØ7DØF2A9Ø88D*1
    8D4A91285Ø22ØE1ØEE6*Ø2C95ØD
    ØF7A94F85Ø22Ø        :REM*1Ø7
159 DATA E1ØEC6Ø2C9ØEDØF7A94Ø*8
    DØ4D48DØBD4A9ØF8D18*D46ØAØ2
    Ø2ØEFØEA5Ø28D        :REM*242
16Ø DATA Ø1D48DØ8D46ØA2ØØCADØ*F ►
```

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BOMB SQUAD

```
    D88DØFA6Ø2ØEFØEAØ8Ø*2Ø4EØE2
    ØEFØE2Ø68ØE2Ø          :REM*182
161 DATA EFØEA91Ø8DØ4D46Ø2ØE4*F
    FC9ØDFØ11C9319ØF5C5*Ø2BØF18
    D97Ø629Ø785AB          :REM*178
162 DATA DØE8A5C5C94ØDØFA6ØA5*A
    2C93C9Ø4ØA9ØF8DØDD4*A9118DØ
    CD4A9818DØBD4          :REM*147
163 DATA A9648DØ8D4A9ØØ85A2CE*2
    6Ø4AD26Ø4C93ØBØ1EA9*398D26Ø
    4CE25Ø4AD25Ø4          :REM*49
164 DATA C93ØBØØFA9358D25Ø4CE*2
    3Ø4AD23Ø4C93Ø9ØØ16Ø*A93Ø8D2
    3Ø48D25Ø48D26          :REM*5Ø
165 DATA Ø42Ø43ØE2Ø82ØEAØØØA9*3
    C8DØ6D4A9818DØ4D4A2*78CADØF
    DCE21DØAD21DØ          :REM*82
166 DATA 29ØFDØECA98Ø8DØ4D488*D
    ØE4A9Ø585Ø22ØEFØEC6*Ø2DØF9E
    69C6Ø13Ø53A42          :REM*12Ø
167 DATA 4F4D423A53515541443A*3
    A3A3A3A3A3A3A3A3A3B*3B3B3B3
    B3A3A3A3A5449          :REM*184
168 DATA 4D453A33123A923Ø3Ø3A*Ø
    Ø111111111111111119A*4C45564
    54C123AØDØD31          :REM*251
169 DATA 3A3A4E4F56494345ØD32*3
    A3A414D41544555520D*333A3A4
    5585Ø455254ØD          :REM*23Ø
17Ø DATA 343A3A4D4153544552ØD*Ø
    D3A43484F4943453A31*ØDØØFC1
    8C26C88B4DØ7A          :REM*81
171 DATA 71727375757373375ØØØØ*Ø
    ØØØØØØØØØØØØE9F16Ø9*Ø3Ø53A3
    AØ1ØDØ114Ø515          :REM*185
172 DATA 123AØ5181ØØ512143A3A*Ø
    DØ11314Ø5123A3AØØØØ*ØØØØØØØ
    ØØØØØØØØØØØØ          :REM*12Ø
173 DATA ØØØØØØØ131111111111*1
    111119AØD12A4A4A4A4*A4A4A4A
    4A4A4A4A4A4A4          :REM*77
174 DATA ØD3A3A3A3A3A3A3A3A3A*3
    A3A3A3A3AØD12A3A3A3*A3A3A3A
    3A3A3A3A3A3A3          :REM*164
175 DATA A3ØD3A313A3A4E45573A*4
    D415A453A3AØD3A323A*3A53414
    D453A4D415A45          :REM*1Ø5
176 DATA 3AØD3A333A3A51554954*3
    A47414D453AØD3A3A3A*3A3A3A3
    A3A3A3A3A3A3A          :REM*37
177 DATA 3AØD3A3A3A43484F4943*4
    53A313A3A3AØD3A3A3A*3A3A3A3
    A3A3A3A3A3A3A          :REM*162
178 DATA 3AØDØØØ1Ø1FØØ14111F1*1
    1ØD51Ø451D816266E76*28Ø41A1
    2CDØ4CDD8111D          :REM*Ø
179 DATA 7279A4Ø424184AØ54AD9*Ø
    B13787C21Ø52D1D9FØ5*9FD9Ø6Ø
    A7C7E76Ø57EC3          :REM*5
18Ø DATA 99BDBD99C37EFF8319Ø1*1
    91919FFFFØ319Ø31919*Ø3FFFF8
    3191F1F1983FF          :REM*46
181 DATA FFØ7131919130F7FFFFØ1*1
    FØ71F1FØ1FFFFØ11FØ7*1F1F1FF
    FFF831F111919          :REM*118
182 DATA 83FFFF1919Ø1191919FF*F
    F83C7C7C7C783FFFFC1*E3E3E32
    387FFFF13Ø7ØF          :REM*131
183 DATA Ø71319FFFF1F1F1F1F1F*Ø
    1FFFF19Ø1Ø1191919FF*FF19Ø9Ø
    1111919FFFF83          :REM*148
184 DATA 1919191983FFFFØ31919*Ø
    31F1FFFFF8319191983*F1FFFFØ
    31919Ø31119FF          :REM*96
185 DATA FF811F83F11183FFFFØ1*C
    7C7C7C7C7FFFF191919*191983F
    FFF1919191983          :REM*134
186 DATA C7FFFF1C1C14ØØØ81CFF*F
    F3911838311139FFFF19*1983C7C
    7C7FFFFØ1E3C7          :REM*254
187 DATA 8F1FØ1FFØØØFØ91F3Ø7Ø*6
    ØØØØØ3C469CBC3C38ØØ*FFC3A59
    999A5C3FFFF83          :REM*184
188 DATA 1911Ø91983FFFFC7Ø7C7*C
    7C7Ø1FFFF8331E38F1F*Ø1FFFF8
    331E3F13183FF          :REM*25
189 DATA FFE1C191ØØF1F1FFFFØ1*1
    FØ3F13183FFFF831FØ3*191983F
    FFFØ131E3C7C7          :REM*231
19Ø DATA C7FFFF831983191983FF*F
    F83313181F183FFFFFF*FFFFFFF
    FFFFFFFFFE7E7          :REM*7Ø
191 DATA E7E7FFFFFFC3B96343C3*C
    7FFFFFØF6EØCF8F9FFF:REM*169
192 DATA -1                :REM*5Ø
```

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On Your Mark!

Test the speed performance of your Basic programs with this C-64 utility.

By WARD SHRAKE

Profiler programs, also called *execution-time analyzers*, are among the better kept secrets in the programmer's toolbox; professional programmers have used them for years. Now you can run a profiler, too, on your C-64 home computer. Profiler 64 finds and reports the slow parts of a Basic program, showing you where you can take steps to speed things up. Once a program has been fine-tuned, it will operate faster and more efficiently.

Think of Profiler as a stopwatch that will time each line in a section of a Basic program. It then creates a "histogram"—a type of bar chart—that shows graphically how long each line took to execute *compared to the other lines*. The longer a line's bar, the more time it took.

Profiler compares each line to the other lines rather than to some set amount of time, so the true relationships between the lines can be seen easily. If the comparison were done any other way—for instance, by merely counting how often each line executed—the chart could be misleading.

Figure 1 and Sample Listing A together provide an example of how Profiler works. Notice that although line 70 is the shortest and simplest looking line in the program, its performance doesn't match its appearance. Looks *are* deceiving, thus the benefit of using Profiler.

Getting Ready

To use Profiler, type in Listing 1 using the Checksum on page 61. Then load it, run it and, by following the prompts, tell it to prepare to analyze a program. When the computer is ready, clear memory by typing the command NEW. The Basic portion of Profiler will be erased, but the important parts will remain hidden, waiting to do their work.

Next, load the Basic program you want to analyze—but don't run it yet. Just before the first line to be timed, insert a line containing a SYS 703 command, to tell Profiler to start its timer. (See Sample Listing B for an example of how to link in the SYS calls.) Just after the last line to be timed, insert a line containing SYS 716, to tell Profiler to stop timing. These are the only changes you must make to your Basic program. (Don't forget to remove the lines when you're done.)

Going the Distance

Now you can type RUN to execute your Basic program. During execution, Profiler will collect the information it needs with little fanfare. In fact, you may not even notice any difference in the way the Basic program runs. When execution ends and you have control of your keyboard again, save the Basic program if needed and then type NEW to erase it from memory.

Finally, load Profiler and run it. This time, when you see the menu screen press the key that displays the results. Profiler will pause to prepare its chart, then ask where to send the chart—to the screen or to your printer. Use a printer if the Basic program you analyzed was lengthy.

The line numbers on the chart correspond to the line numbers in your Basic program. Next to each line number will be a row of dots representing the relative time that the line took.

It's common to see radical differences in the length of the bars—perhaps a handful of very slow lines among others that need little help. Also, as in our example, you may be surprised to discover which lines are the slowest. The reasons for their slowness may be readily apparent, as when you've "crunched" more than one statement into a line, or they may be hard to spot. Things to look for include unnecessary spaces between statements, unneeded parentheses in equations, numeric constants where a variable could be used, and REM statements in the midst of oft-repeated loops. These all make Basic pro- ►

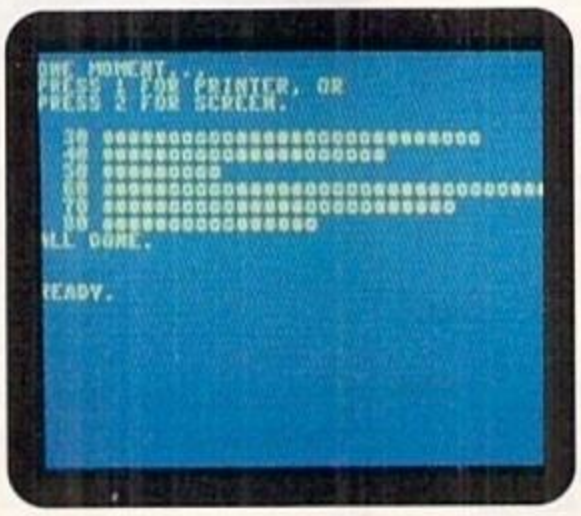

Figure 1. The above screen shows how Profiler graphically graded lines 30–80 of the code at right. Notice that line 70 looks like it would perform better than it does.

Sample Listing A. (Also available on the May/June ReRUN disk.)

```
10 REM SCREEN-BLITZ EXAMPLE (RU
   N PROFILER C64 FIRST)
                              :REM*119
20 SYS703:REM START TIMING HERE
                              :REM*171
30 A=INT(RND(0)*16)           :REM*242
40 B=INT(A/4)+1               :REM*108
50 POKE646,A                   :REM*14
60 PRINTMID$("{CRSR RT}{CRSR LF
   }{CRSR UP}{CRSR DN}",B,1);"{
   CTRL 9} {CRSR LF}";        :REM*235
70 C=C+1                      :REM*85
80 IFC<1000THEN30             :REM*145
90 SYS716:REM STOP TIMING HERE
                              :REM*25
100 POKE646,PEEK(53281)+1
                              :REM*151
110 REM CONTINUE WITH PROGRAM..
    .                         :REM*237
```

RUN it right: **C-64; printer optional**

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grams slow down noticeably. (For more hints, see Stéphane Dirschauer's article "Breaking the Basic Speed Limit," in the January/February 1991 *RUN*, where program modifications are discussed in detail.)

Hints for Finishing First

You can, of course, use Profiler on the same program more than once, to supertune it. Profile it again and again, until you've squeezed out all the performance possible. Your patience and persistence are practically the only limits!

If you take speed very seriously, remember that you can fine-tune Basic programs with Profiler and then compile them using any of the popular Basic compiler programs. The speed difference will make you grin. See you at the track! R

Ward Shrake is a systems analyst, digital technician, programmer and freelance author. His company, SST Racing Software, has released an auto racing simulation called The Racer's Edge.

Sample Listing B. This shows how SYS calls are linked to the files to be tested. (Also available on ReRUN.)

```
5 SYS7Ø3                    :REM*111
1Ø FORI=1TO1ØØ:NEXT         :REM*45
2Ø FORI=1TO2ØØ:NEXT         :REM*93
3Ø FORI=1TO3ØØ:NEXT         :REM*77
4Ø FORI=1TO5Ø:NEXT          :REM*41
45 SYS716                   :REM*166
```

Listing 1. Profiler 64 program. (Available on the May/June ReRUN disk. To order, call 800-343-0728.)

```
1Ø GOTO12Ø:REM MAIN MENU                    :REM*72
                            :REM*177
2Ø FORI=LTOH                 :REM*88
3Ø A=P*PEEK(I+N)+PEEK(I):IFA=.T
   HEN5Ø                     :REM*4
4Ø C=I-L+N:J=J+N:E(J,N)=C:E(J,2
   )=A:IFA>DTHEND=A          :REM*Ø
5Ø NEXT                      :REM*18Ø
6Ø RETURN                    :REM*2Ø2
7Ø FORI=NTOJ                 :REM*158
8Ø B=INT(E(I,2)/D*7Ø):IFB<2THEN
   1ØØ                       :REM*1Ø5
9Ø PRINT#1,RIGHT$("{3 SPACEs}"+
   STR$(E(I,N)),4)" ";LEFT$(M$,
   INT((B-N)/K))             :REM*1Ø6
1ØØ NEXT                     :REM*23Ø
11Ø RETURN                   :REM*252
12Ø CLR:GOSUB68Ø             :REM*57
13Ø PRINT"{3 CRSR DNs}PROFILER
   C64{2 SPACEs}(VERSION 1.1)"
                             :REM*31
14Ø PRINT"BY WARD SHRAKE"
                            :REM*255
15Ø PRINT"PRESS 1 TO PREPARE FO
   R ANALYSIS, OR"           :REM*95
16Ø PRINT"PRESS 2 TO DISPLAY TH
   E RESULTS, OR"            :REM*2Ø
17Ø PRINT"PRESS 3 TO QUIT."
                            :REM*182
18Ø POKE198,Ø                :REM*49
19Ø IFPEEK(198)=ØTHEN19Ø
                            :REM*142
2ØØ GETG$                    :REM*97
21Ø IFG$="1"THEN25Ø          :REM*235
22Ø IFG$="2"THEN38Ø          :REM*35
23Ø IFG$<>"3"THEN18Ø         :REM*7Ø
24Ø END                      :REM*113
25Ø RESTORE:PRINT"{CRSR DN}PREP
   ARING MACHINE CODE..."
                            :REM*137
26Ø FORI=679TO765            :REM*139
27Ø {2 SPACEs}READF:POKEI,F
                            :REM*131
28Ø NEXT                     :REM*155
29Ø PRINT"{CRSR UP}SETTING UP A
   NALYZER...{3 SPACEs}"
                             :REM*78
3ØØ SYS679                  :REM*188
31Ø PRINT"{CRSR DN}ALL READY. L
   OAD THE PROGRAM YOU":REM*96
32Ø PRINT"WISH TO ANALYZE NOW.
   REMEMBER THAT"           :REM*18Ø
33Ø PRINT"SYS 7Ø3 STARTS THE PR
   OFILER, AND"             :REM*252
34Ø PRINT"SYS 716 STOPS THE PRO
   FILER."                  :REM*214
35Ø PRINT"{CRSR DN}RELOAD THIS
   PROGRAM AFTERWARDS TO"
                            :REM*23Ø
36Ø PRINT"VIEW OR PRINT THE ANA
   LYZER'S REPORT."         :REM*192
37Ø END                     :REM*243
38Ø PRINT"{CRSR DN}ONE MOMENT..
   .{8 SPACEs}"             :REM*242
39Ø REM (ANALYSIS BUFFER AREA @
    49152-53247)            :REM*185
4ØØ L=49152:H=53247:J=Ø:D=Ø
                            :REM*11Ø
41Ø RESTORE:FORI=679TO765:READF
   :NEXT                    :REM*132
42Ø FORI=828TO854            :REM*1Ø
43Ø READF:POKEI,F            :REM*32
44Ø NEXT                     :REM*56
45Ø FORI=192TO2Ø7            :REM*2Ø3
46Ø POKE839,I:               :REM*112
47Ø SYS83Ø                   :REM*57
48Ø IFPEEK(829)=1THENH=(I*256)+
   255                       :REM*1ØØ
49Ø NEXT                     :REM*11Ø
5ØØ GOSUB2Ø                  :REM*118
51Ø PRINT"PRESS 1 FOR PRINTER,
   OR"                       :REM*26
52Ø PRINT"PRESS 2 FOR SCREEN.{C
   RSR DN}"                  :REM*1Ø7
53Ø REM USER'S RESPONSE      :REM*45
54Ø POKE198,Ø                :REM*154
55Ø IFPEEK(198)=ØTHEN55Ø
                            :REM*235
56Ø GETG$:K=VAL(G$)          :REM*181
57Ø IFG$="1"THENOPEN1,4:GOTO6ØØ
                             :REM*5Ø
58Ø IFG$="2"THENOPEN1,3:GOTO64Ø
                             :REM*78
59Ø GOTO54Ø                 :REM*153
6ØØ PRINT#1,SPC(2Ø);"PROFILER C
   64 BY WARD SHRAKE"        :REM*86
61Ø PRINT#1:PRINT#1          :REM*88
62Ø PRINT#1,"LINE #{4 SPACEs}CO
   MPARATIVE AMOUNT OF TIME TH
   E LINE TOOK"              :REM*82
63Ø PRINT#1,"----------------
   ----------------------
   -----":PRINT#1            :REM*251
64Ø GOSUB7Ø                  :REM*15
65Ø PRINT"ALL DONE."         :REM*248
66Ø PRINT#1:CLOSE1           :REM*182
67Ø END                      :REM*29
68Ø I=Ø:L=Ø:H=Ø:A=Ø:B=Ø:C=Ø:D=Ø
   :F=Ø                      :REM*59
69Ø G$="":J=Ø:M$="":N=1:P=256
                             :REM*Ø
7ØØ M$="{5 SHFT Qs}{5 SHFT Ws}{
   5 SHFT Qs}{5 SHFT Ws}"
                             :REM*6
71Ø M$=M$+M$:M$=M$+M$        :REM*191
72Ø DIM E(2Ø48,2):REM 'THINKING
    ROOM' ARRAY              :REM*227
73Ø RETURN                   :REM*1Ø7
74Ø DATA 169,192,133,252,169,Ø,
   133,251,168,145,251,23Ø,251
   ,2Ø8,25Ø,23Ø              :REM*97
75Ø DATA 252,166,252,224,2Ø8,2Ø
   8,242,96,12Ø,169,217,141,2Ø
   ,3,169,2,141              :REM*245
76Ø DATA 21,3,88,96,12Ø,169,49,
   141,2Ø,3,169,234,141,21,3,8
   8,96,16Ø,Ø,165            :REM*34
77Ø DATA 57,133,251,165,58,9,19
   2,133,252,177,251,17Ø,232,1
   38,145,251,2Ø8            :REM*1Ø8
78Ø DATA 13,165,58,9,192,133,25
   2,177,251,17Ø,232,138,145,2
   51,76,49,234,Ø            :REM*124
79Ø DATA Ø,169,Ø,141,61,3,16Ø,Ø
   ,185,Ø,192,2Ø5,6Ø,3,2Ø8,4,2
   ØØ,2Ø8,245,96             :REM*2
8ØØ DATA 169,1,141,61,3,96
                            :REM*142■
```

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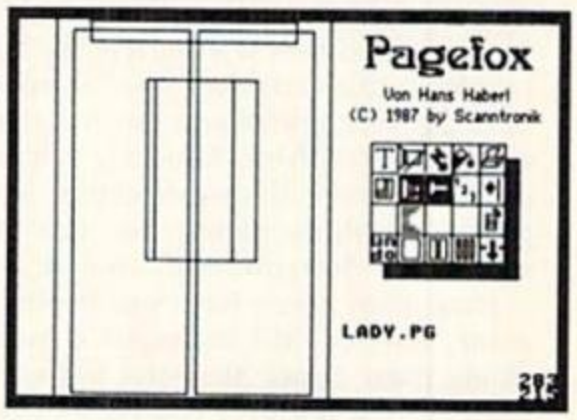

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HARDWARE GALLERY

Quadruple the speed of your C-64 with a new CPU, and load up on dynamo utilities with the handiest cartridge to debut in years.

BY JOHN RYAN

SUPER SNAPSHOT V.5

This May Be the Last Cartridge You'll Ever Need

Super Snapshot from LMS Technologies is perhaps the best cartridge-based software for the C-64 and 128 that I've tested in years. *Whoa*, hold on! That's a serious statement, considering that I've had the opportunity (or misfortune) over the years to test dozens of programs, cartridge and otherwise. I don't make the statement lightly. Super Snapshot is a collection of dynamo utilities that will find a niche in your daily computing for years to come.

What is Super Snapshot, you ask? First and foremost, it's a little cartridge that fits snugly into your expansion port. It is unremarkable except for the small black button on the top—a button that is the power of the entire Snapshot system. The second it is pressed, regardless of the program currently running, Super Snapshot routines become available to you via a series of easily navigated menus.

If you have a game running, there are several features of this cartridge that are immediately attractive. For example, say you're down to your last life in a favorite arcade game. Super Snapshot will allow you unlimited lives at a touch of the button. With this cartridge, you can move through every level of your favorite game without fear of dying. Similarly, you can disable sprite collision detection altogether for those games that use this method to determine life and death.

How many times have you booted a game, only to find the joystick in the wrong port? Super Snapshot will easily swap joystick ports for you via software. I was skeptical of this feature until I had the chance to test it out, and it really works. On a related note, you can also enable joystick auto-fire from the Snapshot menus.

This cartridge is remarkable in its ability to interrupt just about any program and then display the sprites, redefined characters sets, and sounds used by the program. You can even save a game's sprites or redefined characters to disk to use in your own programs. Additionally, machine language programmers have available a very good monitor program, invokable at any time.

Super Snapshot's menus guide you through.

Aside from a gamer's viewpoint, the heart of Super Snapshot lies in its file and turbo load/save routines, DOS Wedge, and ability (with limitations) to save some programs in unprotected form. Super Snapshot's file routines include file copy, disk copy and parameter copy schemes. Using special external files, parameter copy removes copy protection from several dozen commercial programs (for archival use only). I glanced at the parameters available; most of them were for recently released games.

The DOS and file routines are completely compatible with the 1541/71/81 disk drives, and let you set device numbers via software. Moreover, you can set your source and destination drives for file and disk copying and default directory viewing. You can scratch or rename files and format disks (a fast 30-second format) at any time, and create an autoboot file from just about any program.

The Snapshot system itself is designed to save a memory resident program in the form of a single file. For example, you can load in a game that is memory resident (which means that doesn't have to load ancillary files during execution), then save the game as a single, autobooting program. You can also interrupt any program and either save the graphics screen or print it out. Super Snapshot will print screen graphics or sprites in color if you own a Star Rainbow or Epson JX-80 printer.

If that weren't enough, this cartridge also sports a telecommunications terminal program. While not as sophisticated as other commercial programs, it's easy to use and (best of all) is available at the touch of a button. The terminal program supports baud rates up to 9600, as well as the X-Modem, Y-Modem and Punter protocols.

There isn't much to complain about with Super Snapshot. The "unlimited lives" feature is not 100 percent reliable (but did work with 11 of the 14 arcade games I tested), and the terminal program is fairly primitive. Regardless, this jewel is perhaps the last cartridge you'll ever need. *(LMS Technologies; distributed by Software Support International, 2700 NE Andresen Road, Suite A-10, Vancouver, WA 98661; C-64 and 128/$64.95)*

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The Turbo Master cartridge is about the size of the 1764 RAM cartridge and plugs directly into the expansion port of the computer. It's unremarkable, save for the DIP switches located on top that control various configuration aspects of the replacement CPU. The cartridge sports a 6502C microprocessor, which, incidentally, is identical to the 6510 found in ►

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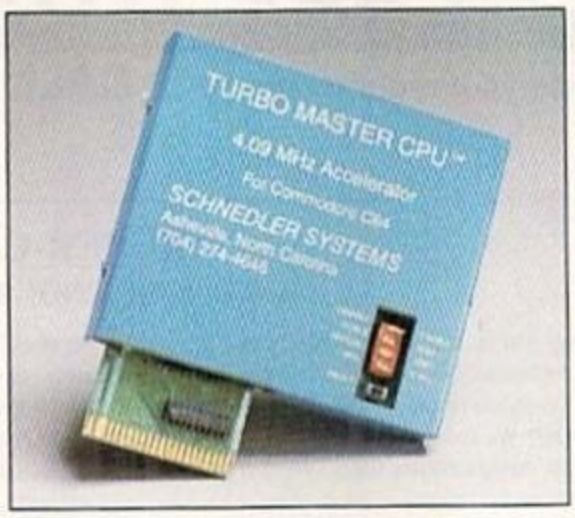
your C-64 computer, except for the 6502C's enhanced op-code set. (The 6510 and 6502 are identical except for zero-page addresses 0 and 1, which act as data direction registers used for mapping ROM and RAM in and out.) The Turbo Master is actually a computer unto itself, complete with CPU, 64K of RAM and an EPROM.

Once the cartridge is installed, the normal C-64 screen will appear and inform you that Turbo Master is active. You can set the cartridge for either 1-MHz or 4-MHz mode via DIP switches or software. This unique feature lets you switch from one mode to the other "on-the-fly" while running a program. The other DIP switches permit you to disable the cartridge or select the cartridge's enhanced ROM over the C-64's "normal" ROM. The enhanced ROM gives you access to the fastload routines, which so far work only with the 1541 or 1571 (in 1541 mode) disk drives. The enhanced ROM does not support tape operation.

Compatibility

A key question about the Turbo Master cartridge is, obviously: How compatible is it? The short answer: very compatible. The longer answer, however, must take into account that programs that rely on precise disk timing routines may have problems, and these include almost all of today's commercial games. (There is a work-around, but more on that later.) Since I couldn't very well test the 12,000 or so commercial programs available for the C-64, I concentrated on software that many of you probably use on a day-to-day basis.

GEOS users will be happy to know that the cartridge works well within the GEOS environment. Turbo Master adds snap to the normally slow screen-scrolling routines that are a hallmark of GEOS. A patch is included on the Turbo Master utility disk that allows it to be used with GEOS. Keep in mind, however, that you'll be unable to use GEORAM with this product unless you get a cartridge expansion motherboard to plug both cartridges into the same port (a configuration that raises serious power supply questions). Turbo Master is not currently compatible with any Commodore REU.



The Turbo Master CPU features easily accessible DIP switches.

At 4 MHz, your mouse will jitter frantically. Thankfully, a special mouse driver included on the utility disk corrects the problem.

This cartridge will surely be interesting to gamers. Will it speed up sluggish game programs? Yes and no. I found that several commercial products wouldn't work with the cartridge. I attribute this to a couple of possibilities. The game may use undocumented 6502 op-codes that are incompatible with the 6502C (undocumented codes can be used as a form of copy protection). Also, some games may take control of or remap ROM in a way that "confuses" the cartridge.

I experienced "artifacting" several times while playing games with hi-res graphics. This is nothing more than the appearance on-screen of a series of random lines and patterns. It didn't happen with most of the games, but was rather annoying when it did. Turbo Master is also unable to view bit-maps loaded into a certain area of ROM.

Most commercial games can be accelerated, as long as you disable the cartridge while the game's fastload routines load in their program files. Once the files are loaded, you can usually re-enable the 4-MHz mode without any problems.

I tested the cartridge on numerous graphics-intensive games, and though it was vexing having to enable and disable the cartridge during disk loads, I had only minor problems (such as artifacting).

Flight simulators, which are graphics-intensive, seemed likely candidates for Turbo Maste; so I tested several. Flight Simulator II wouldn't work with the cartridge installed, though I understand a patch is being developed for this program. Both Strike Aces and Combat Pilot booted, but each had a lot of artifacting. Just about every game had to be loaded in 1-MHz mode first, then switched to Fast mode after the disk access ended. On the bright side, the 4-MHz mode transformed the normally sluggish Strike Aces into a real speed demon. The graphics updates were snappy and much more responsive to joystick input.

One final note on compatibility: not all routines benefit from Turbo Master. Any routine that taps into the hardware interrupt vector, such as housekeeping, cursor blinking and timing routines, will continue to operate at the same speed, because $^1/_{60}$ of a second is the same whether you're at 4 MHz or 1 MHz. Likewise, sound and graphics routines that rely on the Jiffy clock or internal timers will not gain anything from the cartridge.

Great Benefits for Programmers

Basic and machine language programmers, though, will absolutely love

Turbo Master Speed Trials

THIS TABLE compares the TurboMaster-enhanced C-64 to the standard C-64 and three IBMs. The times (reported in seconds) were generated by running a Basic program that executed two nested loops (1 to 200); printed a # character to the screen; and performed two calculations during the 40,000 loops (one calculation numerical, the other forming strings). Listed in parentheses is the speed relative to the standard C-64 (column 1). For example, the TurboMaster was 3.9 times faster executing the nested loop than the standard C-64. Overall, TurboMaster really proved itself.

—Ranjan Bose
Winnipeg, Manitoba

System	C-64	Turbo Master	XT clone	Turbo XT	Turbo AT
Microprocessor	6510	65C02	8088	8088	286
Speed	1.02 MHz	4.09 MHz	4.77 MHz	8 MHz	8 MHz
Nested Loop	47.7 (1)	12.3 (3.9)	32.8 (1.5)	19.6 (2.4)	8.3 (5.7)
Screen Write	130.1 (1)	36.4 (3.6)	268.2 (0.5)	165.4 (0.8)	69.6 (1.9)
Nested Loop With Calculation	172.3 (1)	45.1 (3.8)	139.6 (1.2)	83.3 (2.1)	36.2 (4.8)

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Turbo Master. I wrote a small Basic bubble sort program to sort 100 one-dimensional arrays. At 1 MHz, my routine took 1 minute, 30 seconds. At 4 MHz, the sort was accomplished in just under 24 seconds! However, you will have to work with For-Next loops carefully to achieve timing. And you may have to disable the cartridge when listing Basic programs, because they scroll by too quickly to read!

Machine language programmers will marvel at the speed with which Turbo Master compiles source code. I tested it with Better Working's Power Assembler for the C-64 and was pleasantly surprised at both the speed advantage for compiling and the briskness with which the full-screen editor responded—even with extremely large source code files.

All in all, the Turbo Master CPU is an effective CPU replacement for your Commodore computer. While there are drawbacks to the CPU (such as incompatibility with some programs), the price is well worth the benefits of having an accelerated machine, plus a built-in turbo loader and DOS Wedge commands. Turbo Master is available in a version compatible with Creative Micro Design's JiffyDOS. However, only JiffyDOS revision 5.05 is fully supported so far. *(Schnedler Systems, PO Box 5964, Asheville, NC 28813; C-64/$149)*

The Stik-Gripper Total Control Stand

This Product Really Lends A Hand in Flight Simulations

It seems that having a third hand is a prerequisite for some games. This is especially true of flight/combat simulators, which often require both keyboard and joystick input. The Stik-Gripper can give you that third hand.

This nifty little gizmo is really a sturdy plastic stand, which assembles in minutes, on which you can mount just about any joystick. It stands roughly 12 inches high and is constructed in such a way as to fit snugly between your legs. The flanged base of the Stik-Gripper slides underneath your thighs, so the weight of your body holds the stand in place. Then, using the supplied velcro tabs, you attach a joystick to the top of the stand. If the joystick has suction cups you can forgo the velcro tabs, which are attached with adhesive strips. However, I found that since the top of the stand is somewhat porous, suction cups easily come unstuck in the heat of battle.

Since the whole premise behind the Stik-Gripper is to free one of your hands,

Even the rowdiest gamers will maintain control with the Stik-Gripper.

I tested the device on several programs that require both keyboard and joystick input. Flight/combat simulators benefited most from the setup. In fact, the Stik-Gripper imparts a realistic feel to flight simulation control; with the joystick firmly mounted before me, I was able to control flight and combat missions with great accuracy. The results while playing arcade games, however, were suspect—especially with games that require sudden and precise maneuvers. The stand wobbles a bit if the joystick is moved too abruptly; you may have to brace it with your free hand on occasion.

In summary, the Stik-Gripper is great for all would-be combat pilots. *(Duggan DeZign Inc., 300 Quaker Lane, Suite 7, Warwick, RI 02886; C-64 or 128/$19.99)*

Detachable Keyboard For the C-64

This Intended Space-Saver Is Actually Rather Inconvenient

If your computer setup is anything like mine, chances are you always seem to have more equipment than desk space. Wouldn't it be nice to move your computer out of the way, yet still have access to the keyboard? Well, now you can with The Detachable Keyboard for the C-64 from SER. (Sorry C-128 owners, this won't work with your computers.)

Detachable keyboards have been around for several years for just about every computer except the 64, and such keyboards certainly can help clear a cluttered desk. If nothing else, it's nice to be able to sit back, plop a keyboard on your lap, and have at your favorite game.

The Detached Keyboard for the C-64 isn't a pretty animal; it appears to be assembled from the keyboard of an original C-64. Moreover, it's mounted on a sturdy plastic base and held there by aluminum strips that run the length of the keyboard. If you're worried about color coordination and such, look elsewhere for a replacement keyboard, or your interior decorator will resign.

It is connected to the computer via a six-foot ribbon cable. Installation is fairly straightforward and doesn't require soldering or much technical expertise. First, three screws at the back of the computer must be removed so you can get to the 19-pin socket that drives the computer's own keyboard. This socket fits rather snugly and I had to exercise care when I removed it so as not to bend the pins. (Rocking the socket gently left-to-right while easing it off seemed to help.) Once the old socket is out, the Detached Keyboard socket is inserted in its place.

With the new keyboard attached, you're instantly faced with another dilemma: You can't fully close the computer case because of the protruding ribbon cable. While this problem is more a matter of aesthetics than functionality (the open case won't harm your computer), you may want to keep the computer covered in some fashion if you live in a particularly dusty environment. The documentation states that you can pass the ribbon cable through the user port, but then you won't be able to use a modem.

The feel of this keyboard is about the same as an original C-64, though the feedback is a bit mushy. My biggest complaint is that, unlike a regular keyboard, the Detachable's keyset slants away from you when lying flat, and there are no hinged feet on the back to raise the keyset to a comfortable angle. Even when I placed the keyboard on my lap, typing felt clumsy and uncomfortable.

If I sound skeptical about the Detachable Keyboard it's because I see no real space-saving value in it. The keyboard itself will take up just about as much room as your C-64—and you're going to have to make room on your desk to store the computer also, not to mention the unruly six-foot ribbon cable. (A round cable would have been more manageable.) Add to this the fact that the keyboard is uncomfortable to type on.

If you use your C-64 in a work environment with a lot of grit, grime or dust (such as in a coal mine), then the Detachable Keyboard makes sense, since it lets you protect your computer. However, if you're looking for something to make working at your 64 a more comfortable, convenient experience, I'd pass on this one. *(SER, PO Box 85382, Racine, WI 53408; C-64/$45)* ■

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ProTips

Some good advice and ideas about Basic 2.0, the 1581 disk drive, GEOS and word processors.

Compiled by JANICE GREAVES

1581 Drive: Inserting a disk in a 1581 drive requires a push that usually slides the disk drive back across the desk. With two 1581 drives, a 1571 and a 1541, this minor annoyance really began to get on my nerves!

My visiting daughter came to the rescue: For $2 she purchased one of those flexible rubber jar-lid grippers that can be found in most housewares departments. I trimmed the piece to fit under the feet of the drive, and set the 1581s on top . . . No more shifting!

—William Clark
Lynden, WA

Basic 2.0: To find out how much room is left on a disk quickly, simply type:

```
LOAD"$3",9↵   {↵=RETURN}
LIST↵
```

It will list the title and the number of blocks free.

—John Hollander
Newmarket, Ontario

Basic 2.0: This quickie program lets my computer and printer act like a typewriter. It's handy when typing addresses onto form letters, for typing short notes, and when I just don't need to spend time loading and running a word processing program.

```
10 OPEN 3, 4
20 GETKEY A$
30 PRINT#3,"";A$;
40 PRINT"{CTRL 9}";A$
50 GOTO 20
```

Type carefully, though, because it won't let you correct mistakes!

—Luke Coady
Trufant, MI

Certificate Maker: The screen instructions tell you to press CONTROL-S to toggle the font size between medium and small. The CLR/HOME key does the same thing in a single keystroke.

—David M. Jordan
Budingen, West Germany

General Word Processing: Beware of depending too much on spell checking devices in your word processing programs. They don't pick up grammatical errors such as "there" for "their," or typos that are real words like "is" for "it."

Also, many word processing programs will return you to the beginning of the document after executing the Save command. This can be quite aggravating if you want to save while in the middle of a long document—which is certainly a very good idea. You can easily find your place again if you mark it before saving with a string of unusual characters, such as this: **********.

Then use the Find command to locate your place. If your word processor doesn't have a Find option, make your place marker easy to spot so you can pick it out while scrolling through the text.

—Jack Fournier
Venice, FL

GeoPaint: You can use Color mode as a snap feature in geoPaint. When color is on or when using cut, copy, or paste, your edit boxes will automatically expand to the nearest 8 × 8 card borders. Make the boxes a few pixels small and let the automatic expansion take care of uniform size and placement. If you want to move the image in your scrap less than 8 pixels, click Color Off in the options menu and use a regular edit box for your fine tuning.

The 8 × 8 color cards can be clearly seen if you select Color mode and use canvas color to put down a convenient grid. I usually use white since the default canvas color is light gray. It doesn't have to be undone later since your output is not affected unless you're using a color printer. And it's invisible when Color Off is clicked from the options menu.

—William Turcotte
Maple Grove, MN

GeoPaint: Despite all the improvements that have gone into geoPaint, it still has an incorrect ruler. Its horizontal scale of 80 pixels per inch is fine when printing on an 80-dpi printer, however, the vertical pitch of most printers is not 80 dpi, but 72 dpi. GeoPaint's vertical scale of 80 pixels per inch affects its Constraint function when drawing squares or circles. The result is that the objects appear oblong, both on the screen and in print.

To draw circles that also print out as circles, first select the pixel measure, then draw a square, manually adjusting the scale to 80 pixels per inch horizontally (X) and 72 pixels per inch vertically (Y). Select the circle tool, click first in the upper-left corner of the square, then move the mouse till the circle fills the square. The cross hairs of the pointer will be in the lower-right corner of the square. Click again and you will have a perfect circle. Then erase the square, and you're finished.

Unfortunately, the Grid function cannot be used for correct placement because it also allows 80 pixels per vertical inch.

—Ranjan Bose
Winnipeg, Manitoba

GEOS: Do you have lots of geoFonts yet can't remember what they all look like? Are you too *geo*Tired to go looking for just the right one in your well maintained(?!) *geo*Catalog of *geo*Font samples? Quit *geo*Whining! Use an icon editor to capture a sample of each font as a file icon. (I use an uppercase F and lowercase o.) The deskTops of your font disks will become *geo*Picture catalogs!

—William Turcotte

GEOS v2: If you forgot to key previously installed applications to the new GEOS boot disk when first loading it, they won't work with GEOS v2. Moreover, the key-in procedure can never be redone. So applications like geoFile that you used with an earlier version of GEOS are now worthless, Right?

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251913 Kernal/Basic	16.95	SX64 Kybd/Cable	49.95
251715 Mem. Ctrl	19.95	1541/1571 Parts	Call
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PROTIPS

new GEOS v2. Doing this certainly saved my day!

—Henning Vahlenkamp
Matawan, NJ

GEOS: Do you usually load some applications and files into an REU before running—like deskTop, for instance? Leave your commonly used files on the border of the disk. Open the disk, then the REU. Add a page to the REU, then move the files directly from the border to the second page. You won't have to do so much pointing and clicking to get started, and you'll save the front page of the REU for today's job.

—William Turcotte

GeoWrite: geoWrite calculates and prints an 11-inch page on the assumption that the NLQ font is ten points high. Reduce the NLQ font to eight points and the printout will be nearly 14 inches (the size of legal paper).

—Jerry Skelley
Forestdale, MA

Grade Star 128: When using this grade book from Loadstar 128, would you like to store more than the current grading period on one floppy disk? Grade Star names its files by class period. Attaching a decimal suffix to that information will create separate files for each distinct suffix. So simply call your first period class "1.1", your second "1.2", and so on.

—Thomas Sipe
Greensburg, PA

Okidata 120: The manual for this printer does not mention NLQ (Near Letter Quality) print modes. But I have found that if you hold down the form feed button while turning it on, you will get NLQ results.

—Jeff N. Waters
Edmond, OK

Paperclip III: Often, for instanace when I'm typing several short notes, I don't need (or want) the printer to scroll to the top of the next page after printing. I have found that I can prevent this if I type the character £ on the line just following the text that I want to print.

This little procedure works well, and saves me time, paper and money.

—Richard Duffy
Cypress, CA

Pocket Series Software: Pocket Writer, Pocket Filer and Pocket Planner do not have a printer file for the Panasonic KX-P1180. However, the printer file for this machine is the same as that for KX-P1090 except for the following:

```
CR:
CR(no LF):13
LF:10
```

Unless these changes are made, there will be no line feed. You can produce line feeds by turning on the printer's DIP switch 3, but this causes many graphics programs to print *double* line feeds.

There are slight variations between the KX-P1090 and KX-P1180 regarding the various pitches. The printer manual gives the proper codes for these, and for foreign characters if languages other than French are used.

—Dr. Warner Linfield
Oreland, PA

Superbase: Your records will be easier to read from the screen if each field is assigned a different color. This is easily done by including in your output program the appropriate CHR$ color code in front of each field name. The following program line, for example, will display AUTHOR in light green, TITLE in light red, and PUBLISHER in gray:

```
DISPLAY CHR$(153)[AUTHOR]CHR$
(150)[TITLE]CHR$(152)[PUBLISHER]
```

Appendix E of the C-128 manual lists the various CHR$ color codes. See your C-64 manual if running Superbase 64.

Those with monochrome monitors can also benefit by using the codes to get black, white and shades of gray.

—Donald Garvelmann
New York, NY

Word Writer 4: Before previewing your printout, make sure your cursor is at the top of the screen, or the preview will start where your cursor is positioned. It is also wise to press CTRL-CLR/HOME so that it can realign the margins after you have made editing changes.

—Lance DeMello
Elk Grove, CA ■

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GEOWATCH

Unlock a bountiful treasure chest of little-known, but useful, GEOS accessory programs.

By GERRY DESCOTEAUX

EVERYONE LIKES A TALE about finding hidden treasure. In this geoWatch, I've dug up some program gems: some of the most helpful tools in the GEOS collection. The majority of these programs are available on QuantumLink, but others come on *RUN*'s GEOS Power Pak disks or the GEOS system disk. For the addresses of program sources and for prices, refer to the company/product list on page 46.

GEOPAINT GEMS

When working with GEOS, I often need to use stored graphics, such as "larger than window" geoPaint clips. GeoPaint doesn't allow you to clip or copy anything larger than what appears in its approximately one-sixth-page work window. Thus, it's impossible to save an entire large image as a photo scrap. It can be saved only in a standard geoPaint file, which is much less convenient.

Paint Scrap by Dennis N. Seitz makes it easy to do the impossible. From the program's full-size geoPaint-like preview screen, you can turn geoPaint graphics of any size into photo scraps. This is one of my most valued tools for creating documents that combine text and graphics.

Along the same line, a great tool for improving the geoPublish/geoPaint marriage is Doug Fults's Paint Drivers program. It creates drivers that "print" files back and forth between geoPublish and geoPaint, endowing you with greatly improved editing and fine-tuning capabilities. Paint Drivers comes on theGEOS 2.0 system disk from Berkeley Softworks.

DOWN THE RAM ROAD

When working with the RAMdisk, I sometimes need to download information or graphics from one of the telecommunications systems I patronize. The Rboot program on Berkeley's GEOS system disk saves me the time of shutting down my C-64, loading the needed communications software, then, after the download, returning to GEOS and reloading the files I had in RAM—perhaps 60 of them.

Most of these external (non-GEOS) programs can be loaded from inside GEOS, either by double-clicking on the program's boot file (usually the first file on the disk) or by escaping GEOS through the Options menu and then loading the program normally. In addition, most of these programs can return you to the original Basic screen, which is necessary for using the Rboot function.

If you choose, you can install a reset button on your C-64, so that even if the program doesn't return you to Basic, you can get there without turning off the computer and losing the files in RAM. With the Rboot file in RAM and on my work disks, all I need to do after returning to Basic is enter `LOAD "RBOOT",8,1` and, *voilà!*, everything in RAM is present and ready to use.

When I first tried geoRAM, this function wouldn't work and I felt lost without it. Searching for a solution, I consulted the Q-Link/GEOS experts, who suggested that the chip configuration in my 64 was the problem. Months later I ran across geoRep Jim on Q-Link and laid out my story. He just couldn't buy it and went to work, shortly discovering that the programmers at Berkeley hadn't updated the Rboot file to accommodate their 512K RAM expansion unit. Now, thanks to the extraordinary programming talent of Jim Collette, geoRAM owners can take advantage of Rboot. Just download his Rboot Fix from the Q-Link/GEOS libraries.

KEEP IN FILE

Jim also wrote geoWizard and MiniDesk, an accessory included on the geoWizard disk. MiniDesk is great for renaming, scratching and copying files between disks, and can be run either as a standard desk accessory or through geoWizard. The geoWizard disk (see the January/February 1991 *RUN*, p. 48) is available from Comm-plex Software.

RUN's GEOS Power Pak disks 1 and 2 can be purchased through *RUN* Special Products. Power Pak 1 includes the original version of Bill Coleman's geoTerm—a terminal program for use inside GEOS. GeoTerm 2, in Power Pak 2, provides multiple-protocol file transfers and full buffer functions, making it the ultimate in GEOS telecommunications programs. To get geoTerm from Q-Link you'll need to pay a download (plus-time) fee, but it's minimal and the program is well worth it.

FOLLOW THE RIGHT TRACK

In Power Pak 1, you'll also find a handy program for use with geoWrite. Write Hand Man, by Joe Buckley, counts both the words and sentences you've written, and categorizes the words according to the number of letters they contain (66 one-letter, 95 two-letter, and so forth).

Joe is also responsible for HulmeView, another companion to geoWrite that reads any Commodore sequential text file from the GEOS deskTop. HulmeView can be a real time-saver, because it lets you preview the files and leave out any you don't want to convert.

. . . AND WATCH THE TIME!

Talking about time, Rick Koch's autoexecute file called Auto Clock makes a handy addition to the GEOS system disk. During boot-up it asks for the time and date, then makes this information available to GEOS for time- and date-stamping of documents each time you work on them. When you need to know the last time you worked on a file, you can either look it up by accessing the deskTop's File Information menu or by selecting the file and pressing COMMODORE/Q.

Still another toy for you time watchers is Analog Clock by Douglas S. Curtis. This desk accessory places an analog clock on your screen from inside any application. It's handy if you don't have a clock in the room and don't want to bother going through the deskTop to check the time. Analog Clock and Auto Clock are both available on Q-Link.

ALL THAT GLEAMS IS NOT GOLD

A couple other geoWrite gems are Tool Kit by Rick Krantz and Wrong Is Write by Q-Link's Red Storm (Joe Buckley). Tool Kit lets you do entire-document formatting, rather than the page-by-page formatting currently available in geoWrite. This program is a must if you

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create multi-page word processing documents in GEOS.

Wrong Is Write is the finest and most versatile text converter available anywhere, in my opinion. This little nugget of a program transfers any word processing file between the GEOS and Commodore sequential formats. It's great for downloading and editing text files, and it's easy to use, too.

Another auto-execute program I'd like to mention can save your monitor screen from "burn in" when the display doesn't change for a long time. Installed on your system disk, Jim Holloway's Blackout blanks your screen when it hasn't sensed any mouse or keyboard activity for six or seven minutes. One keystroke or touch of the mouse immediately restores the screen just as it was before. Be sure to get this program—your monitor will thank you for it.

To change input or printer drivers while inside a GEOS application, you've always had to access the deskTop and then the appropriate menu. Now, with Selector 64 by John L. Brown installed in your RAMdisk, you can switch drivers almost instantly from within an application. It's handy, for example, when a task requires both a dark-print driver and a paint-pages driver, or a Koala pad and a mouse.

Finally, there is another creation by Bill Coleman. Convert 2.5 is the latest in his series of GEOS conversion programs. Convert lets you switch files between GEOS and the telecommunications format needed for up- or downloading; version 2.5 allows multiple file selection. The original version of Convert is available on *RUN*'s Power Pak disk 1; upgrades come from the massive Q-Link libraries.

These jewels are at the top of my treasure chest. Try them, and if you like them, explore for your own favorites. Many handy programs are waiting out there, often suited to a specific task.

A Map Will Help

The *Q-Link 1990/91 Software Guide* will ►

More geoGems

By STÉPHANE DIRSCHAUER

Desk accessories are possibly the most helpful of all the programs available for use with GEOS. The GEOS system disks contain seven of them, and there are more. Here's a sampling:

Michael T. Graham's MeasureMan transports geoPaint's ruler tool to other applications. With it, you can measure the length of any image in both pixels and inches.

Bill Sharp's geoHexCalc, a replacement for the old Calculator accessory, is intended primarily for programmers. Its major distinction is its ability to accept input and present output in any of three forms: hexadecimal (base 16), binary (base 2) and, of course, decimal (base 10). Calculations can be made in any of the bases, and converting values from base to base is a snap. In addition to doing the standard four arithmetic operations (there's no exponent key), geoHexCalc can perform AND, OR and exclusive-OR calculations. All in all, this accessory is a great addition to geoProgrammer work disks. For other users, though, it's limited in that it handles only those integers from 0 to 65,535.

Adding Tools

Both of these desk accessories have at least one thing in common: They work with any application, providing it supports the files. Some accessories, however, are intended for use with only one program. David B. Ferguson's NewTools, for example, adds a fresh toolbox to geoPaint. When activated, it replaces the old icon strip with a new one offering 16 functions that rotate, skew and slant any block of graphics. It also generates an amusing effect, better seen than described, that "arrows" the text. NewTools is well executed and, in fact, seems like a part of geoPaint, that is, until you discover that its changes are only temporary. In order to keep the changes, you must use an old tool to modify the screen in some way, even if it's only by drawing a shape and then erasing it. Nevertheless, NewTools is a great idea, and with any luck even better programs of its type will come along eventually.

. . . Automatically

The rarest type of GEOS companion program, and possibly the most intriguing, is the auto-execute file. It can be opened from the deskTop just like other programs, but, installed on your system disk, it will load and run automatically before the deskTop is activated. This is convenient for quite a few easily forgotten tasks that must be done each time you use GEOS. The following are a few examples.

The System error is the deadliest of the GEOS demons. When the computer is asked (most always inadvertently) to execute a BRK assembly language instruction, it jumps to a routine with the droll name of Panic—Roll Over and Die (see *The Official GEOS Programmer's Reference Guide*). The system puts up a dialog box saying "System Error near #xxxx," then freezes. You can eliminate the System error by putting NewSysError on your system disk. It modifies the Panic routine so you can usually escape a System error and return to the deskTop by just clicking your mouse.

Another auto-execute file is Larry Armstrong's Quick-Dater, which prompts you for the system date before GEOS activates the deskTop. There's also AutoRAW, a utility that plays RAW-type sound files upon booting.

Consult your favorite telecommunications network or local bulletin board system to download these public domain and shareware programs.

A word of caution: Be very careful if you add any auto-exec files to your original system disks.

A Little Diversion

On a playful note, Lester Gock's geoSliders, a rendition of the traditional sliding-tile puzzle, provides a quick diversion from more "serious pursuits." There are 15 lettered tiles and one empty slot in geoSlider's four-by-four grid. You must arrange the tiles in alphabetical order by clicking your mouse to slide one tile at a time into the vacant spot.

Stéphane Dirschauer is a frequent contributor to RUN.

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help in your search. It lists thousands of titles, many in a section devoted exclusively to GEOS. (Some of the programs are shareware; if you try one and like it, be sure to send the author his due.) You can also find a wealth of information in Q-Link's GEOS Chat Room and on the GEOS Customer Service Message boards, Software Showcase/GEOS Area.

The *Software Guide* is available for purchase from Q-Link. Programs are available for only the plus-time cost of downloading. ■

Gerry Descoteaux uses GEOS on his C-64 to publish The Back Page, *a monthly music magazine for southern New Hampshire.*

List of Sources, Programs and Prices

QUANTUMLINK
8620 Westwood Center Drive
Vienna, VA 22180
800-392-8200 ($9.95 monthly)

GEOS Area of the Software Library
Analog Clock—Douglas Curtis
Auto Clock—Rick Koch
Blackout—Jim Holloway
HulmeView—Joe Buckley
Paint Scrap—Dennis Seitz
Rboot Fix—Jim Collette
Selector 64—John Brown
Tool Kit—Rick Krantz
Wrong Is Write—Joe Buckley

***RUN* MAGAZINE SPECIAL PRODUCTS**
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***GEOS Power Pak I** ($19.95)*
Convert 1.0—Bill Coleman
GeoTerm 1—Bill Coleman
Write Hand Man—Joe Buckley
Wrong Is Write—Joe Buckley

***GEOS Power Pak II** ($19.95)*
GeoTerm 2—Bill Coleman

Also available from *RUN*:
***GEOS Companion Disk** ($24.97)*

COMM-PLEX SOFTWARE
6782 Junction Road
Pavilion, NY 14525-9755

***geoWizard disk** ($16.95)*
MiniDesk—Jim Colette

BERKELEY SOFTWORKS
2150 Shattuck Ave.
Berkeley, CA 94704

GEOS 2.0 Boot Disk
Paint Drivers—Doug Fults
Rboot—Berkeley Softworks

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Q-Link Downloading Tips

Follow these simple steps to retrieve programs and useful information from the QuantumLink online network.

By GERRY DESCOTEAUX

ALONE AND APPREHENSIVE, you poise to begin the journey to downloading from QuantumLink. After all, to the new traveler such a network is dark and mysterious. This article will end your anxiety. If you can push your F1, F3, F5 and F7 keys, then you have the power to download everything from games and music to news and productivity programs.

Let's start with an overview of Q-Link's Software Showcase. Once there, you can access all the files available on the network, which number in the thousands. In addition to the software libraries, you can get online help directly from software producers, such as Berkeley and Electronic Arts, in the form of message boards and live chat areas. You also have access to the Post Office and all the other areas on Q-Link.

Software Showcase

Q-Link has a feature similar to the "buffer capture," available on most terminal programs. With Q-Link, you can capture the screen at any time by hitting your F3 key. It's handy if you like to read news or sports files offline. Remember, this function saves the contents of your screen or buffer. It is not a method of downloading software.

You can download files in three ways. The simplest is to select the option that reads "Download a Specific File" from the Software Libraries menu. To use this option, you must know the name of the file and the uploader's handle (as listed in the Q-Link library).

The uploader's handle and real name are usually different. In addition, the uploader may not be the author of the program. If you don't have the filename and the uploader's handle, you can use the options described in the sections below: Search the Libraries, and Browse the Libraries.

Let's run through an example: You want to download a file called Autoclock. Q-Link will ask, "What is the name of the file you wish to download?" Respond by typing AUTOCLOCK. When prompted for the uploader's handle, type CRYCKET. Then a message appears saying that the file's been located and telling you to have a formatted disk in the drive. From there it's automatic—the file is saved on your disk.

Finding a File

If you're unsure of a file's name or uploader, use the second option: Search the Libraries. After selecting Search, you see a submenu that lists the various libraries on Q-Link, including C-64, C-128, CP/M, GEOS, and many others. After selecting a category, type in a search word. Let's say you've heard of a file called Tool Something-or-Other. Type TOOL and Q-Link will locate a file called Tool-kit, by RMK1.

Other titles might also show up on this screen. Select the one you are interested in by pressing F1. The file's dossier will come up, showing information such as how many times the file has been downloaded, how long it will take to download the file's size, the date it was uploaded and what other files are needed to operate or convert it. Select the Download menu by hitting F7, or return to the previous screen by pressing F5.

From the Download menu, you can not only download the file, but read comments by others who've previously downloaded it. You may also post your own questions or comments. This menu includes a few other options, but they aren't currently operational.

Browsing the Libraries

The third route to downloading a file from Q-Link is called Browsing the Software Libraries, which fairly describes the process of roaming through the massive collection and viewing the countless titles. Again you have the option of accessing specific areas, such as C-64 or C-128, and once you've found a title you wish to download, you're shown its dossier and prompted to select the Download menu.

Q-Link divides the files into sections by date. To view files according to date, first select whether you want them listed by name or type. Then select the menu showing the dates you're looking for and you're ready to browse the titles. When you've found an interesting title, you can look at its dossier. If you're not interested in downloading it, just hit F5 to return to the listings. Hitting F5 at any prompt or screen will take you to the previous menu.

Finally, there are a few other libraries on Q-Link that are accessible through their respective areas. For instance, you may select the News and Reference Magazine section and move to *RUN* Magazine Online, where you'll find *RUN*'s own software library. There you can download, among others, some files you've seen listed in *RUN* magazine. You'll also find the *RUN* Premium Libraries, where you can download files from *RUN*'s GEOS Companion disks and other disks that the magazine offers for sale. All of the titles in the Premium Libraries cost a $1.50 download fee in addition to the regular plus-time fee.

As you can see, downloading software from Q-Link is not especially complicated. There are menus for every conceivable process (including downloading help and information, if you need it), and they're as close as your F1 key. Remember to have a blank formatted disk ready before you go online, and you should have no problem traveling down the Q-Link road. ■

Gerry Descoteaux is a frequent contributor to RUN.

The Function Keys

F1 - Select checked item
F3 - Save current screen
F5 - Return to previous screen
F7 - Select the Download menu

Q-Link's Address and Number

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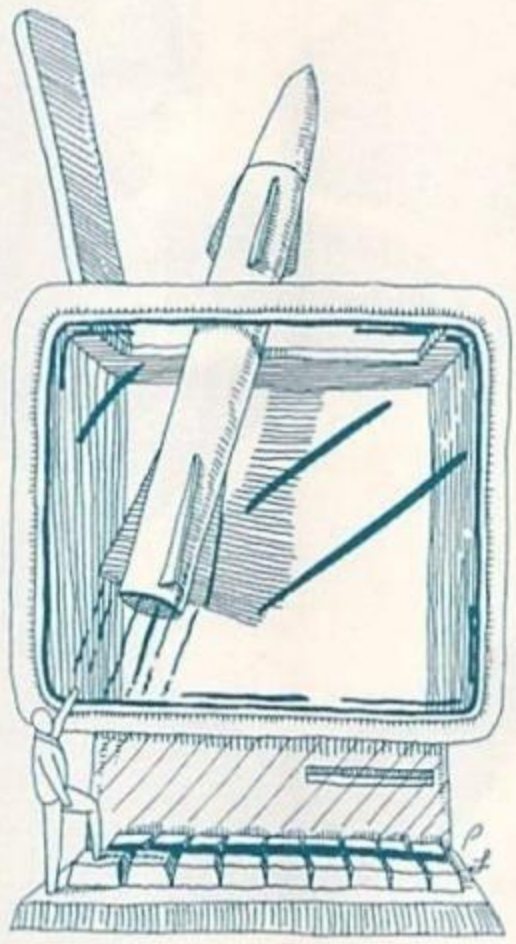
128 Mode

Get a new angle on smart weapons with this programming exercise in plotting trajectories.

By MARK JORDAN



THE HIGH-TECH weaponry in the opening days of the Persian Gulf war fascinated the public. In particular, how were certain missiles able to detect and shoot down others? I went to my C-128 for the answer. The result is Missile-Buster, a simulation that suggests the kind of computer brainwork involved in some of our smart weapons.

This article will look at the programming logic needed to shoot down missiles in a simplistic, two-dimensional computer-screen environment. By extrapolation, we can appreciate the intelligence of a real-life antimissile missile.

But first things first: Type in Missile-Buster from Listing 1, using *RUN*'s Checksum on page 61 to catch any typing errors. Then save your work before running it.

Taking Aim

The only role you have in Missile-Buster is, sadly, that of the antagonist: You're the launcher, so you determine how fast and at what angle the missile will fly. Set the speed by pressing the 1–9 keys, 1 being the slowest. Set the angle by pressing the CURSOR-UP and -DOWN keys. Then press the RETURN key to fire.

Actually, there's one other role open to you, that of student. By pressing 0 before RETURN, you'll get a stop-action view of the attack and counterattack. The screen will pause when the defensive missile's radar senses the offender, then it will show you the angle of intercept (which the defender has laboriously calculated) and approximately where it plans to zap the bomb.

If you've ever programmed sprites on the C-128, you know there's a wealth of commands that can send the sprites scurrying. Likewise, there's a bunch of functions that can pinpoint at any moment where the sprites are, how fast they're going, and such.

In creating this simulation, I had to decide if it was fair to use these commands to do the hard work, or if, in order to "think" like a true defensive weapon, I should do it the old-fashioned way. The answer that came was, of course, to use the functions. Real intelligence is involved in this process for only one thing: figuring out how to make the two missiles meet.

Triggy Questions

Consider for a moment that we can find the coordinates of a sprite (say, sprite 4) at any time by reading RSPPOS (4,0) for X and RSPPOS(4,1) for Y. We can find the sprite's speed with the same command by putting a 2 inside the parentheses: RSPPOS(4,2). But how do we find out where the sprite will be at a later moment? And when is that later moment? And one more thing: How do we know the angle at which the sprite is moving? The Commodore engineers didn't build in this function.

I found the answers in trigonometry. *Trigonometry!* You remember, that class you took in high school that seemed to have no point. Well, creating this program finally taught me at least one real, practical application.

On a computer screen everything is placed on a grid. If you know two points on the grid, you can draw a line between them and form a triangle with the X and Y axes. Triangles are what trig is all about. If you know the length of the two legs of any right triangle, you can calculate all the angles with trig functions.

Do we know the length of two legs? Sure. The vertical leg is simply the difference between the offender's and defender's Y values. The horizontal leg is a little more complicated to calculate. I used a practical approach in this program by simply halving the difference between the two missiles' X values. It isn't engineering elegance, but it works.

Now for the hard part: using these two numbers to calculate that flight angle. The Commodore's ATN (arctangent) function will do the job. If we divide the Y value by the X value and put the result in this function, we'll know the angle we need, except for one teeny factor: The C-128 gives its trig results in radians. To convert to degrees, we must divide by 0.01745. (Why that number? Beats me; I got it from a math teacher.) The function looks like this: ATN(Y/X)/M. You'll find a form of it in line 600 of the program.

Contact!

Once the angle of counterattack has been established, it's time to fire the defensive missile. If calculated properly, an interception should result.

And usually it does. However, as mentioned, the algorithms I used in this program are more practical than precise. The problem lies in the fact that while the C-128 is doing all that fancy trig work, the MOVSPR commands are scuttling sprites along, making the calculations slightly inaccurate.

Because of this, I installed an interrupt routine to do some last-second calculations that correct the defensive missile's aim while it's in flight. Accuracy still isn't perfect, and, as in the real world, occasionally an offensive missile will get by.

I hope you enjoy using Missile-Buster. If it enlightens you half as much as it did me, you'll understand smart weapons

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better than you did before. More than that, I hope you'll be inspired to use your computer as a kind of home science kit. These days I find myself turning to my C-128 more and more to understand the real world. R

Mark Jordan is a high school English teacher as well as RUN's *128 Mode columnist. He promises not to defect to the Defense Department.*

Listing 1. Missile-Buster program. (Available on the May/June ReRUN disk. To order, call 800-343-0728.)

```
10 FAST:FORT=3507TO3989:READA :
   POKET,A:NEXT          :REM*60
20 SPRSAV6,AB$:SPRSAV7,8:REM*37
30 LC$=CHR$(14):M=.01745
                         :REM*144
40 FORT=1TO40:SP$=SP$+" ":NEXT
                         :REM*116
50 SC(0)=3:SC(1)=8:SC(2)=7:SC(3
   )=10                  :REM*109
60 COLOR4,1:COLOR1,10:GRAPHIC1,
   1                     :REM*125
70 CIRCLE1,50,45,30,25   :REM*29
80 FORT=0TO5:X=22-T*3:Y=X:S=6-T
                         :REM*234
90 SSHAPERD$(S),X,Y,X+23,Y+20
                         :REM*244
100 NEXT                 :REM*230
110 CHAR,20,1,CHR$(219):SSHAPEC
    $,152,0,175,72:SPRSAVC$,6
                         :REM*151
120 SCNCLR:WIDTH2        :REM*62
130 FORT=1TO50:X=RND(1)*320:Y=R
    ND(1)*131:C=RND(1)*15+1
                         :REM*99
140 COLOR1,C:DRAW1,X,Y+8:REM*47
150 NEXT                 :REM*25
160 FORT=1TO5:X=T*24+152+24:Y=1
    36                   :REM*36
170 COLOR1,T+2:COLOR0,8:REM*245
180 GSHAPEAB$,X,Y        :REM*93
190 IFT AND1 THEN GSHAPEAB$,X,1
    15                   :REM*106
200 NEXT                 :REM*75
210 COLOR1,16:FORT=20TO24:CHAR,
    0,T,SP$,1:COLOR1,12:NEXT
                         :REM*216
220 COLOR1,16:CHAR,0,20,LC$+"{S
    HFT S}CUD {SHFT A}NGLE 110"
    ,1:AN=110:SD=3       :REM*216
230 COLOR1,7:CHAR,0,0,LC$+"{SHF
    T S}PEED:1-9{2 SPACEs}{SHFT
     A}NGL:UP/DN{2 SPACEs}{SHFT
     F}REEZ:0{2 SPACEs}{SHFT R}
    TN:{SHFT F}IRE",1    :REM*160
240 GOSUB700             :REM*56
250 SLOW:SYS3507         :REM*165
260 :                    :REM*63
270 DO                   :REM*248
280 FORLP=1TO6           :REM*60
290 ON LP GOSUB 350,520,620,350
    ,520,620             :REM*184
300 SPRSAV RD$(LP),7     :REM*10
310 S=LPAND3:SPRITE3,,SC(S):SPR
    ITE5,,SC(S)          :REM*216
320 NEXT                 :REM*195
330 LOOP                 :REM*52
340 :                    :REM*143
350 GETA$:IFA$=""THEN470:REM*12
360 IFA$=CHR$(13)THEN BEGIN
                         :REM*77
370 YY=130-(AN-105)*3    :REM*15
380 MOVSPR4,0,YY:MOVSPR5,488,YY
                         :REM*111
390 MOVSPR4,AN#SD:MOVSPR5,AN#SD
                         :REM*108
400 BEND:GOTO470         :REM*57
410 SD=3:IFVAL(A$)>0THENSD=VAL(
    A$)                  :REM*165
420 IFA$="{CRSR DN}"AND AN<130T
    HENAN=AN+5           :REM*132
430 IFA$="{CRSR UP}"AND AN> 95T
    HENAN=AN-5           :REM*58
440 IFA$="0"THENAC=1     :REM*222
450 SP=SD*1              :REM*198
460 COLOR1,16:CHAR,10,20,STR$(A
    N)+" ",1             :REM*197
470 OX=X:OY=Y            :REM*115
480 X=RSPPOS(4,0):Y=RSPPOS(4,1)
                         :REM*95
490 IFY<25THEN700        :REM*163
500 RETURN               :REM*128
510 :                    :REM*58
520 IFPA OR X<25THEN600:REM*234
530 SPRITE7,0:SPRITE3,1:REM*148
540 PA=1:VX=X-OX:VY=Y-OY:FA=VY/
    VX                   :REM*251
550 HX=(344-RSPPOS(4,0)+SP)/2
                         :REM*90
560 HY=244-RSPPOS(4,1)-HX*FA
                         :REM*168
570 AE=ATN(HY/HX)/M:AG=269+AE
                         :REM*67
580 MOVSPR2,AG#SD:MOVSPR3,AG#SD
                         :REM*104
590 IFAC THEN GOSUB770:SLEEP2:M
    OVSPR4,AN#SD:MOVSPR5,AN#SD:
    AC=0:GOTO580         :REM*202
600 RETURN               :REM*228
610 :                    :REM*158
620 IFPEEK(8185)=57THENRETURN
                         :REM*170
630 YY=25                :REM*111
640 DO:IFYY>0THENYY=YY-1:REM*76
650 MOVSPR2,180+YY#3:MOVSPR3,18
    0+YY#3               :REM*223
660 MOVSPR4,180-YY#3:MOVSPR5,18
    0-YY#3               :REM*109
670 LOOP UNTIL RSPPOS(2,1)<25
                         :REM*216
680 POKE8185,57:POKE8187,59
                         :REM*175
690 :                    :REM*238
700 RESTORE1070:FORT=1TO7:READA
    ,B,C                 :REM*151
710 SPRITET,1,A:MOVSPRT,B,C:MOV
    SPRT,0#0             :REM*34
720 NEXT:SPRITE3,0       :REM*57
730 COLOR1,12:FORT=21TO24:CHAR,
    0,T,SP$,1:NEXT       :REM*194
740 PA=0:AC=0:LP=6       :REM*168
750 RETURN               :REM*127
760 :                    :REM*49
770 FORT=2TO5:MOVSPRT,0#0:NEXT
                         :REM*188
780 MOVSPR6,335-HX,240-HY
                         :REM*120
790 COLOR1,12            :REM*167
800 CHAR,16,21,LC$+"{SHFT X}-CO
    ORD."+STR$(X),1      :REM*71
810 CHAR,16,22,LC$+"{SHFT Y}-CO
    ORD."+STR$(Y),1      :REM*126
820 CHAR,16,23,LC$+"{SHFT V}ELO
    CITY"+STR$(VX),1     :REM*10
830 CHAR,16,24,LC$+"{SHFT A}NGL
    E{3 SPACEs}"+STR$(INT(AE)),
    1                    :REM*105
840 RETURN               :REM*213
850 DATA 120,169,192,141,20,3,1
    69,13,141,21,3,88,96,173,30
    ,208,133,250,41      :REM*47
860 DATA 8,240,33,165,250,41,2,
    240,27,169,63,141,249,31,14
    1,251,31,169,2       :REM*3
870 DATA 141,139,17,141,138,17,
    141,160,17,173,21,208,41,23
    5,141,21,208,56      :REM*57
880 DATA 173,217,17,237,221,17,
    201,8,176,8,169,2,141,139,1
    7,141,150,17,76      :REM*228
890 DATA 101,250,0,0,0,0,0,0,0,
    0,0,0,0,0,14,0,0,15,128,0,2
    7,96,0,29,120,0      :REM*186
900 DATA 62,182,0,62,215,128,23
    ,235,96,17,237,88,16,126,22
    2,8,30,190,8,7       :REM*245
910 DATA 188,8,1,252,4,0,120,4,
    0,88,4,0,128,127,255,252,25
    5,255,248,0,112      :REM*32
920 DATA 0,0,124,0,0,63,0,0,15,
    192,0,3,240,0,0,236,0,0,59,
    224,0,14,128,0,3     :REM*129
930 DATA 0,0,1,0,0,1,0,0,0,0,0,
    0,0,0,0,0,0,0,0,0,0,0,0,0,0
    ,0,0,0,0,0,0,0,0,0   :REM*6
940 DATA 0,0,0,0,112,0,0,0,0,0,
    0,0,0,0,0,0,0,0,0,0,0,0,0,0
    ,0,0,120,0,0,238     :REM*90
950 DATA 128,0,213,115,0,91,188
    ,192,118,79,0,13,248,192,6,
    39,0,1,203,0,0       :REM*31
960 DATA 176,192,0,72,0,0,38,0,
    0,0,0,0,0,0,0,0,0,0,0,0,0,0
    ,0,0,0,0,0,0,0,0     :REM*54
970 DATA 0,0,0,0,0,0,0,0,0,0,0,
    0,0,0,0,0,0,0,0,0,0,0,0,0,0
    ,96,0,0,56,0,0       :REM*34
980 DATA 30,0,0,15,224,0,31,191
    ,0,63,253,248,240,127,238,0
    ,3,255,0,0,31        :REM*192
990 DATA 0,0,0,0,0,0,0,0,0,0,0,
    0,0,0,0,0,0,0,0,0,0,100,0,0,1
    8,0,3,13,0,0         :REM*13
1000 DATA 211,128,0,228,96,3,31
     ,176,0,242,110,3,61,218,0,
     206,171,0,1,119     :REM*239
1010 DATA 0,0,30,0,0,0,0,0,0,0,0,
     0,0,0,0,0,0,0,222,247,189,22
     7,24,199,227,24     :REM*35
1020 DATA 197,227,24,199,222,24
     7,189,227,24,199,227,24,19
     7,227,24,199,222    :REM*60
1030 DATA 247,189,247,189,239,2
     22,247,189,227,24,199,227,
     24,197,227,24       :REM*121
1040 DATA 199,222,247,189,227,2
     4,199,227,24,197,227,24,19
     9,222,247,189       :REM*49
1050 DATA 247,189,239,222,247,1
     89,222,16,144,0,138,160,0,
     117,32,0,27,80,0    :REM*160
1060 DATA 51,192,0,134,160,0,13
     ,80,0,17,22         :REM*17
1070 DATA 16,318,228,2,320,234,
     3,337,234,4,0,26,3,489,27,
     2,0,0,2,290,212     :REM*245
```

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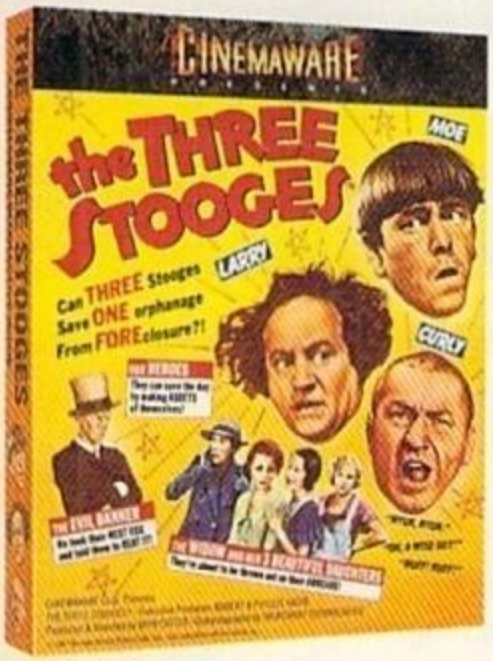

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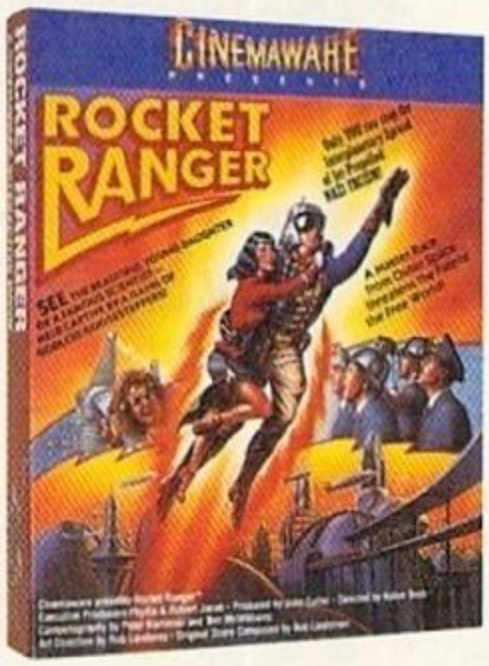

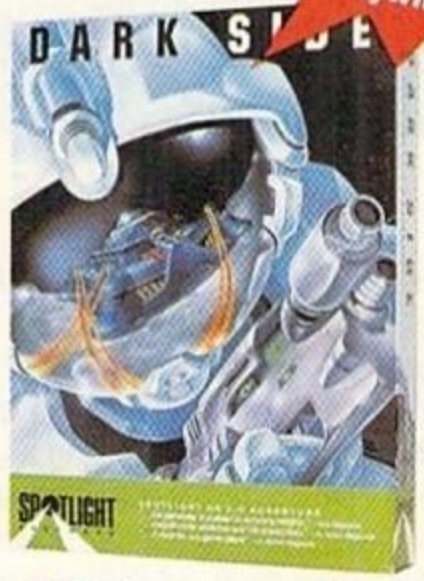

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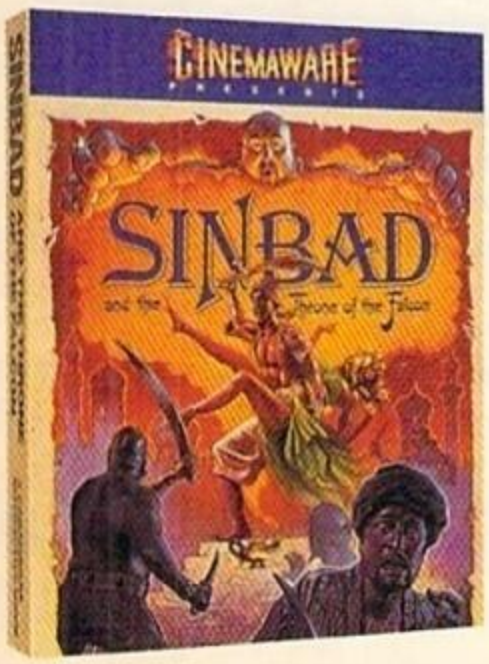

Sinbad and the Throne of the Falcon

This entertaining software uses detailed, full-screen graphics, animation and music to create a convincing Arabian Nights backdrop. This mystery encounters evil magic, perilous waters, enemy swordsmen and monsters in a unique blend of role playing and strategic arcade-style sequences.

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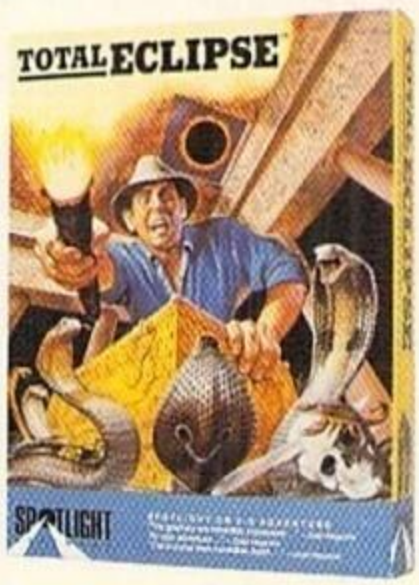

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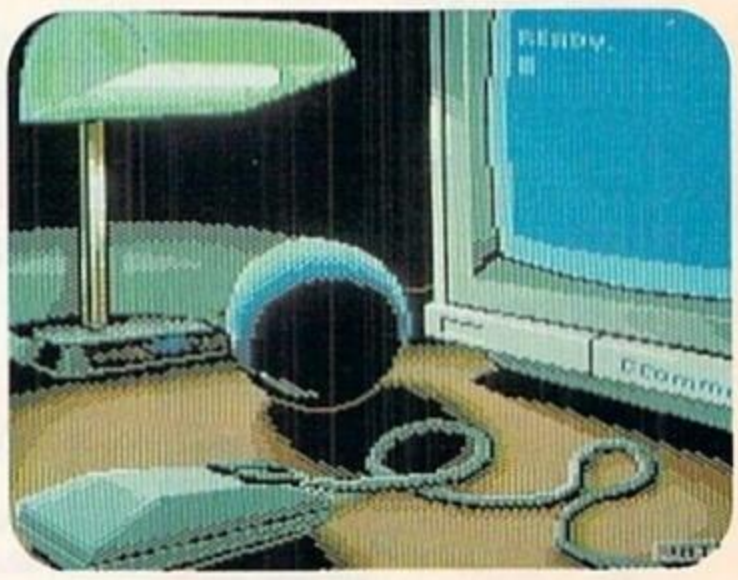

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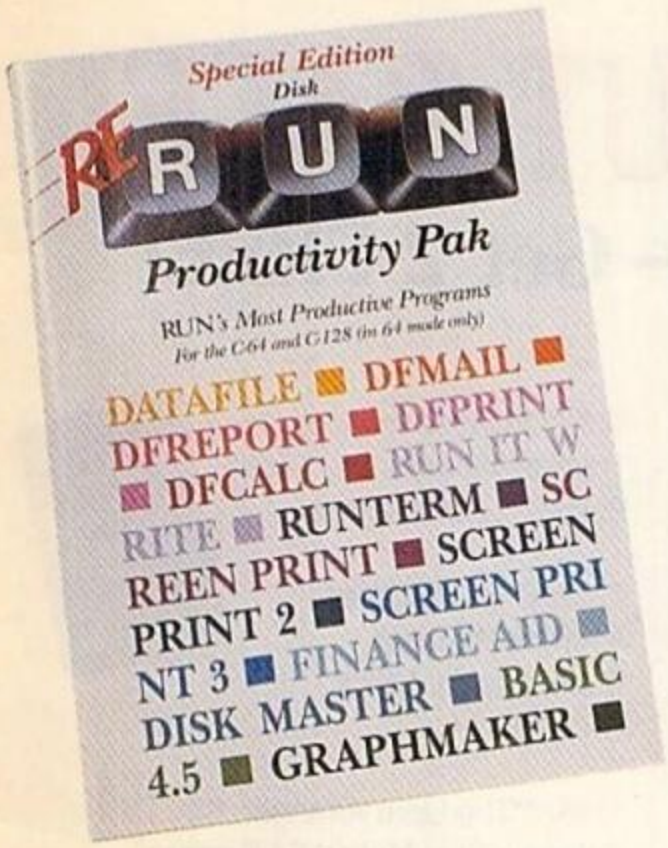
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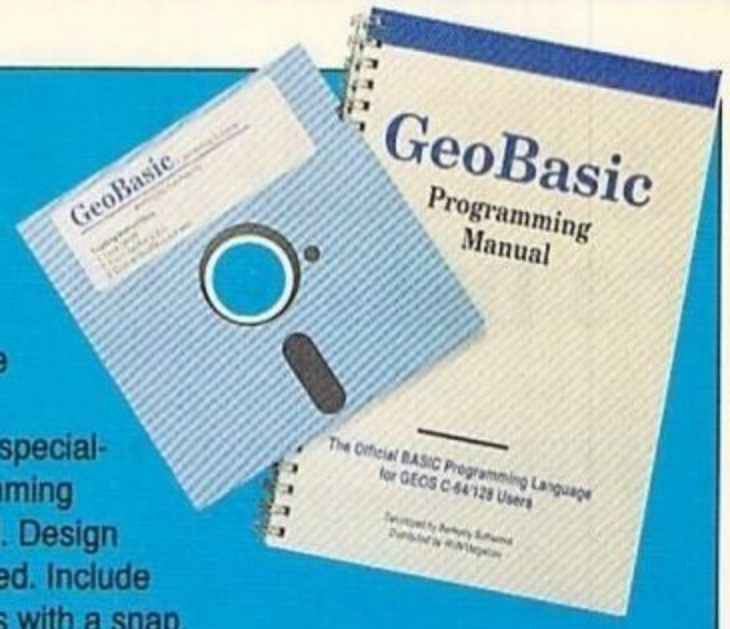

Bring point-and-click performance to all your programs with this long-awaited high level programming language from Berkeley Softworks. The GeoBasic package includes five specialized editors which make programming easier than you've ever dreamed. Design the exact pulldown menu you need. Include bitmap graphics in your programs with a snap. Includes editors for Icons and Dialog boxes, as well as a full featured Sprite Editor. All are accessible from the Text Editor. Comes complete with sample applications and 138-page spiral programming manual.

#GB **$34.95**

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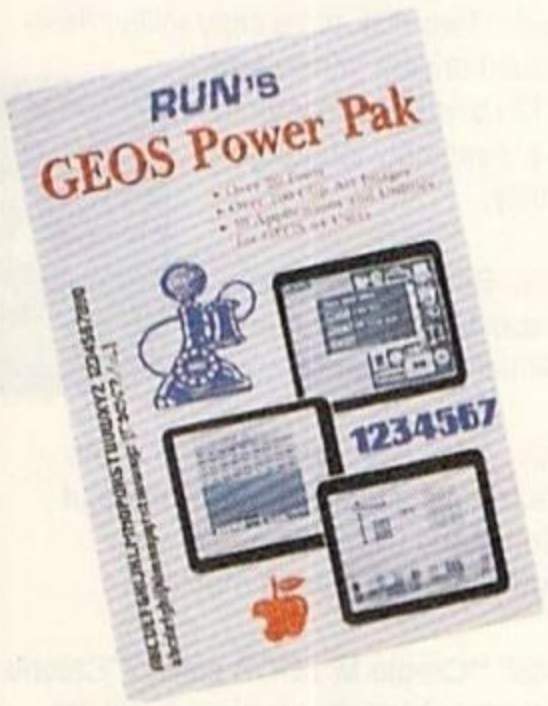

GEOS Power Pak

This revolutionary disk features the best talent in the GEOS community. This two-sided disk is packed with ten of the most practical GEOS desktop accessories, utilities and applications, plus 21 fonts and over 100 clip art images. GEOS Power Pak expands C-64 capabilities, increases your efficiency, and makes you more productive. Isn't that why you got your C-64 in the first place?

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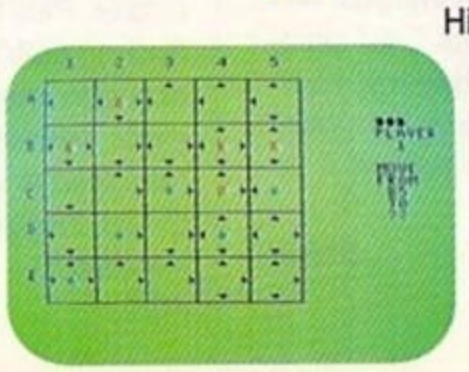

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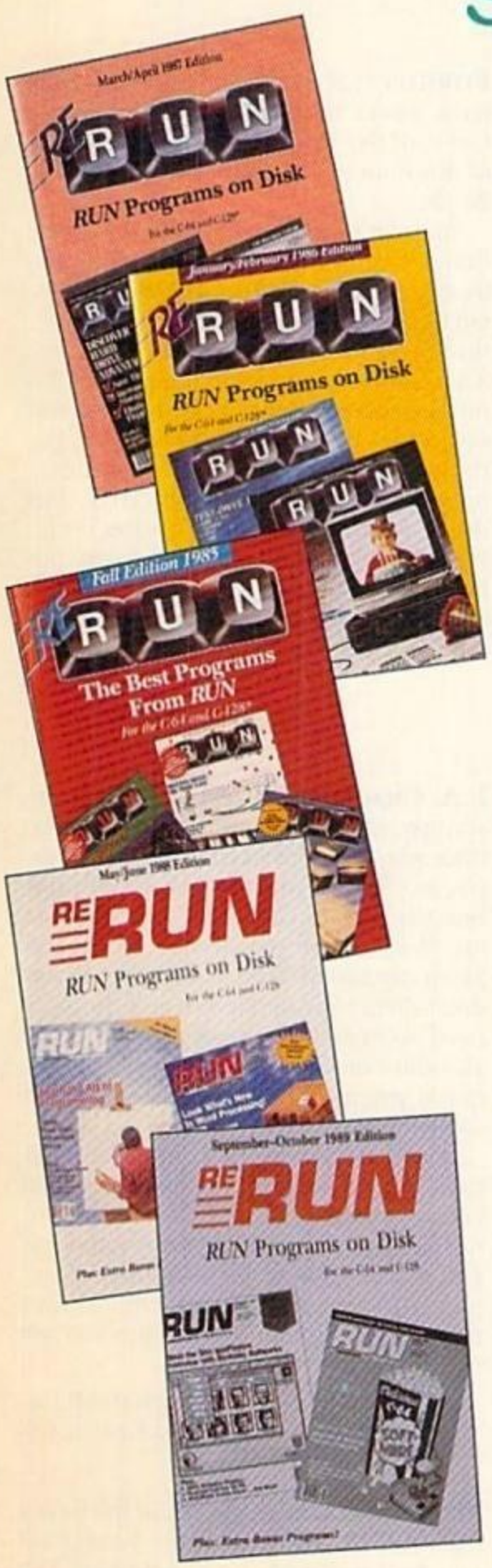

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GOLD MINE

Score big with these great strategies for Battletech, Bloodstar, Buck Rogers, Ultima VI, Platoon and other games.

By LOUIS F. SANDER

ARKANOID II: The tip about getting infinite paddles by entering DEBBIE S is a genuine godsend (Gold Mine, March 1990)! Practically every time you hit a regular block, you get a fireball special, which clears the screen more quickly by giving you special options. I personally prefer the one that gives about 20 of the balls that break through everything on the screen.

One block, however, comes back after you shoot it a certain number of times. In order to get rid of it, knock it off the screen, then lose the ball. When your next turn comes around, the block will be gone.

—JIM MACIOROWSKI
PORT RICHEY, FL

BUCK ROGERS: Take a rope! When exploring the asteroid base near Ceres, you will need to use the elevator to get down to level two. The elevator shaft blows up before you can go back, so the rope is your only escape.

When you're leaving, you'll be attacked by pirates. They will give you the choice to fight or surrender. Don't fight: Surrender! The pirates will then throw you into a cell and take away your items, but you can then bypass security and escape the cell.

Log entry 14 is a map of the ship, which you find eventually anyway on level 12. There you will also find an armory with a rocket launcher.

—DUSTIN WINTERS
SAYVILLE, NY

BATTLETECH: The best 'mech is the Chameleon. At 50 tons, its kick can cripple almost any other 'mech in the game. Its large laser has the longest range and will cause the most damage. But, it's only a training 'mech. I found a way to win the last training maneuver with the Chameleon, and keep it to use in the other levels.

The four Jenners that you fight during that last training maneuver will always win in a firefight and will out-run you in a chase. But they can only run toward you in a straight line. As you begin fighting the Jenners, move your Chameleon southwest as fast as possible. When the base is destroyed, parts of the south wall will be destroyed as well.

The trick now is to run behind the wall, keeping it between you and the Jenners. When all four Jenners are on the other side, run directly south. The Jenners are too dumb to run around the wall, and they can't shoot you from behind it. After a few rounds, you'll flee the battlefield with the Chameleon, which is now the most powerful 'mech on the planet!

Don't be alarmed if the picture of a Jenner trying to crunch you appears—you'll still have the Chameleon. It seems that the programmers just didn't think it was possible.

—RYAN FISCHBACH
CARMICHAEL, CA

BLOODSTAR: This is the best 128 game that I've ever played. The 1581 and an REU make it great entertainment.

On turn 1, set your diplomacy to Cordial for the other players. After buying the research station and making the first shuttle launch, save the game. Then buy seven probes and send one to each of the near planets and moons, as far out as Jupiter. Use your turns without making any more launches, until all the probes have arrived at their destinations.

Note the environment and agriculture levels for each of the targets, with special attention to Mars, Phobos, Deimos and Jupiter, since you will usually get these to colonize. You must have at least one target with high environment (85–99) to have a good start in the game. Zero agriculture indicates a dead planet or moon, and cannot be colonized. If the game doesn't look good at this point, reboot and start again using the same save procedure. Be patient, as it may take a few turns to find the right conditions.

If the game looks good this time, load the turn that you saved before and buy probes to send to those targets that were found suitable. These probes will keep you informed about your targets, and they will also show you where the other players have colonies.

—ROBERT POTTER
EL PASO, TX

FORGOTTEN REALMS SERIES: This trick works on Champions of Krynn, Curse of the Azure Bonds, Hillsfar, Pool of Radiance and Secret of the Silver Blades.

You can quickly and easily duplicate items (like money and magical things) by engaging in a little disk deception. Go to the Training Hall and give everything you want duplicated to one character. Remove him from the party, then put a write-protect tab on the disk you saved him to. Add the character to the party and trade all his goodies to other members. Drop him to the disk, but don't remove the write-protect tab. He'll be removed from the party, but he'll still remain on the disk. Keep adding him back until everyone in your party is rich.

—SAL CASTIGLIONE
SAYVILLE, NY

L.A. CRACKDOWN: With this program, you can save your game and then continue playing. This way, if the game ends, you can begin from the last saved position, correct the fatal mistake and move on. Your current stats will be saved. Use Sleep instead of Time Compress. If you don't sleep your rookie will quit. Rookies need up to eight hours of sleep for every 16 hours on duty. Your rookie will also quit if you ask him to plant a bug when someone is in the room.

If you find yourself completely baffled, try reviewing the pictures and tapes you already have. Often some little bit of information will fit in with what you already know. If your bugs don't pick up anything, move them. To find new buildings, follow everyone you see driving.

—LANCE DEMELLO
ELK GROVE, CA

MEAN STREETS: To get out of the boiler room on Alcatraz, move the boxes and get the key. Open the panel below the viewscreen and get the gas mask. Look at the control panel and flip the switch. This opens the furnace, turns on the

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sprinkler and opens the boiler room door. Run out before it closes again!

—Henning Vahlenkamp
Matawan, NJ

Might & Magic II: When you are weak, but your Sorcerer has a spell level of three, fly to A,2. Turn until you see the Pinehurst sign, then go forward until you come upon the mountains. Now go two spaces into the snow, turn left, and go forward until you see the Death Spider.

If he asks you a riddle, answer KEYS. Keep walking until you find an oasis. Enter it and find the Greatest Fountain. If you drink from it, your statistics will increase to 200 and your level will be 50. Fight anything—you'll usually win.

—Joshua Griffin
Naples, TX

Neuromancer: Don't bother with a ROM construct; it's not very useful. To escape the island prison, use all of your AI skills, such as Phenomenology and Sophistry. You'll confront the Neuromancer himself. First hit him with Kuang Eleven 1.0, then use your AI skills. He'll crumble after a few shots and you'll win.

—Henning Vahlenkamp

Platoon: Key 7 will transport your sodier to the explosives, key 8 to the village, and key 9 to the bridge.

When you press 7 you'll be at the site of the explosives, but they won't be there. To find them, walk to another section of the jungle and back again. The explosives will be there when you return.

Press P to pause and G to resume.

—Jamie McDaniel
Paducah, KY

Red Storm Rising: If the range of surface ships exceeds 20 on Target Motion Analysis (TMA), and the ships are heading away from you, press Active Sonar Toggle for two or three "pings." When you do this, the ships will automatically turn toward you. Toggle this off and on to lure them into torpedo range. Be careful—too many pings at once will give you away and you'll become a target.

—Glendon Pyle
Dalhart, TX

Robocop: On levels one and three, Robocop has a secret feature: He can levitate! Push the fire button and the U, I and O keys simultaneously. At the same time, move the joystick to the top left corner to go up, extreme left to go down.

—Contributor Unknown

Teenage Mutant Ninja Turtles: To beat Rocksteady, select a turtle with a good bottom attack, like Donatello. Stand as close as you can to the crates. When Rocksteady charges you, jump up and do a bottom attack on the way down. Continue this until he is defeated.

—Steven Ocepek
Akron, OH

Thunderblade: Fly at the lowest possible altitude on levels that show a top view. The enemy won't shoot and you'll be able to hit them more easily.

To avoid being shot down at the end of the first level, fly backwards.

—Sergio Laurant
Curacao, Netherlands Antilles

Times of Lore: What if you travel all the way to Rhyder to buy holy water from Friar Khane, then discover that you don't have enough gold? Kill him and take it if you have enough guts. Otherwise you will have to keep traveling until you get the gold you need.

—Sergio Laurant

Ultima VI: After you kill the gargoyles at the beginning of the game, talk to Lord British and tell him about your Orb. He'll show you how to use it. Go to Yew and buy swamp boots for your whole party. Wear them and you'll be able to walk through swamps.

Once you're strong enough, go to a shrine. Don't kill the Gargoyles! Cast the spell of sleep on them, then talk to them when they awaken. To gain levels of experience, get the rune to a shrine. Use it, speak the mantra, then talk to the shrine.

—John Peters, Jr.
Raynham, MA

Who Framed Roger Rabbit: To pick up all the papers from a table in the Ink & Paint Club, hold down the fire button while Roger goes around the table. But be careful—if you hold the button down too long, Roger will pick up a drink and go crazy!

—Ryan Hidalgo
Garnerville, NY ■

Send your tips to The Gold Mine, PO Box 101011, Pittsburgh, PA 15237. Put your name, address and social security number on each piece of paper you send, and please use 8½-by-11-inch paper. Please state which computer your tip is for. Neatness and clarity count. RUN pays $5 per submission on publication.

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RUN Amok

Oh well. Here are the corrections to some bloopers in our last issue.

Item: **Magic**, March/April '91, page 8, **#S5BA**, **64 Screen Divider**—In line 110, the `20,8` should be `208`

Item: **Magic**, March/April '91, page 8, **#S5BC**, **Disk/Dir Colorizer**—Line 20 should end with quotes ("), and in lines 30 and 40 the `GOTO` statements should be preceded by colons (:) instead of semicolons (;). In line 90, `BLANK` should be followed by a comma (`BLANK,`). Line 110 should read as follows:

```
110 OPEN15,8,15,"N:"+CHR$(13)
    +DC$+DN$+X$          :REM*92
```

Item: **Magic**, March/April '91, page 9, **#S5BD**, **Lottery Odds**—In line 40, after the `TO` statement,

instead of `R:L*J NEXT J`
it should read `R:L=L*J NEXT J`

Item: There was a problem with last issue's **Crossword Puzzle** found on page 55—Line 14 should contain six spaces (one more to the left) to accommodate the word ANALOG. Also, the box to the right of #15 should be black.

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COMMODORE CLINIC

Transferring C-64 files to MS-DOS, printer questions and hope for a Pascal programmer.

By ELLEN RULE

Q *I saw an ad for Big Blue Reader 64, which states that this utility transfers word processing, text and ASCII files between the MS-DOS and Commodore disk formats. I'm looking for a program that will make my C-64 IBM-compatible. Will this do the job?*

—R.T. GONZALEZ
EL PASO, TX

A With Big Blue Reader from SOGWAP Software (115 Bellmont Road, Decatur, IN 46733; 219-724-3900; $44.95), you can transfer *text files* back and forth between 64/128 and MS-DOS disks. Thus, 64/128 users who also use PCs can work on a file with both computers.

On the other hand, *programs* written for MS-DOS computers won't run on the C-64/128 (or vice versa). They are based on different microprocessors and chip architectures. In short, you can transfer files, but not programs. There is no IBM emulation software available for the C-64 or 128 that will make them truly "IBM compatible."

Q *I have a 1541 disk drive and recently purchased a 1541-II. I changed the DIP switches in the back of the new unit to device 9, but the drive number reads as 0, not 1. Is there any way to get the 1541-II drive number to read 1? And can the 1541-II use the Duplicate command?*

—MARILYN BEST
BRENTWOOD, NY

A The Duplicate command was replaced by the Backup command on the C-128 for use with dual disk drives such as the MSD-II. The two drives in dual units are designated as 0 and 1, and the Backup command is used to copy whole disks between them. Single-drive units, such as the 1541-II, 1571 and 1581, are designated as 0. To copy entire disks with a single-drive unit, you can use the RUN Shell program on the RUN Works and Super Starter Pak disks (*RUN* Special Products, 800-343-0728). C-128 users can use the Copy Disk command within the 1571 DOS shell, found on the 1571 Test/Demo Disk.

Public domain and shareware copy programs, such as Jim Butterfield's CopyAll, are available from user's groups and can be found on many BBSs. For backing up copy-protected software, get a commercial program such as Maverick (Software Support International, 2700 NE Andresen Road, Suite A-10, Vancouver, WA 98661. 800-356-1179; $39.95).

Q *I recently purchased a used C-64 with a 1541 disk drive and a Commodore VIC 1525 graphics printer. I also have word processing software by Spinnaker. The software asks for printer-font control codes that are not listed in my VIC 1525 manual. I'd like to be able to print in different type styles, such as bold and underlined, but don't know the codes.*

—DEBRA HODGKINS
CENTERVILLE, MA

A Unfortunately, the 1525 doesn't have any alternate text styles. To get different text styles, find a program that offers bit-mapped fonts, such as geoWrite by Berkeley Softworks or FontMaster II by Xetec.

When using geoWrite with the 1525 or any other 60-dpi printer, use only the left two-thirds of the page to avoid cutting off text. With FontMaster II, you must ask Xetec for a special disk of fonts.

Q *Until a month ago, I had no trouble printing graphics on my Okidata 120, but now it skips a line. Can you tell me what causes this problem?*

—RICHARD FORSYTH
CHEEKTOWAGA, NY

A You could have a dirty print head. Clean it with alcohol or a commercial print-head cleaner. Then spray it with a lubricant like WD-40.

Often, when printouts have that "Venetian blind" look, you have incorrect printer or linefeed settings in your software. Check them against the software manual.

Also check to see that the DIP switches are set according to the printer manual. Turn each switch off and on to make sure the contact is good. If this doesn't solve the problem, note the current position of each switch, then change them, one setting at a time, testing after each change. When you find the proper setting, jot it down in the software manual.

If all of these methods fail, you probably have a broken or bent pin. Correct this by replacing the print head.

Q *I have seen software that says it requires a C-128D or a C-128 with a 64K video upgrade. What is a 64K video upgrade, and where can I find it?*

—JASON MCCARVER
ABILENE, TX

A The video display controller (VDC) RAM upgrade increases display memory from 16K to 64K. This enables true multicolor graphics on the 80-column screen. It's also used by some RAMdisk utility programs that are designed to access its memory.

The 128D comes with 64K of RAM, but the 128 needs to have the VDC RAM upgrade chip installed. This is a very delicate procedure, and should only be done by an experienced repair person.

Q *I am an avid Basic and Pascal programmer and want to do both on my C-128. I heard of a Pascal environment called Super Pascal 64, but when I inquired, I was told that the 64's memory is too limited for Pascal. Is there Pascal software for the C-64/128?*

—LANE DUNCAN
SAN ANTONIO, TX

A Yes. Abacus Software (PO Box 7211, Grand Rapids, MI 49510) produces Super Pascal for the 64 and 128. It implements the full Jensen & Wirth compiler plus extensions for graphics, and has a complete source-file editor, a full assembler and a comprehensive utility package, plus other features including a free runtime package. Many of *RUN*'s advertisers carry this software. ■

Send your questions to Commodore Clinic, 80 Elm St., Peterborough, NH 03458. Questions are answered only in this column and may be edited for space and clarity.

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RUN's Checksum & Program Typing Hints

TYPE IN *RUN*'S CHECKSUM, which serves for both the C-64 and for the C-128 in either 40- or 80-Column mode, and save it to disk before running it. When typing in a program from *RUN*, first load and run *RUN*'s latest version of the Checksum program, which contains a new feature explained below. The screen will display a SYS number (49152 for the C-64; 3328 for the C-128) that deactivates and reactivates the Checksum. Always disable *RUN*'s Checksum before attempting to run another program. Note: You can abbreviate Basic keywords; spaces affect the checksum only when within quotes; and the order of characters affects the checksum.

When you press return after typing in a program line, a one-, two-, or three-digit number from 0 to 255 appears in the home position. If this number matches the checksum value in the program listing, the line as you typed it is correct. If the number that appears doesn't match the checksum value, compare the line with the magazine listing to find your error. Then move the cursor back up to the line and make your corrections. Now, after you press return, the correct checksum value should appear. Continue entering the listing until all the lines have been correctly typed. Then deactivate *RUN*'s Checksum, using the appropriate SYS number, and save the finished program.

We sometimes get letters and phone calls from new readers who have typed in the Checksum program for the first time. They are confused by the "Out of Data Error in Line 30" message that appears when they try to run the Checksum program. Understandably, they compare line 30 of the listing with line 30 as they typed it in, and cannot find anything wrong. The message unintentionally misleads them into thinking the error is in line 30, whereas the typing mistake is actually somewhere in one of the Data statements in lines 190–350.

So, we've added a new feature to the Checksum program that alerts readers to the number of the Data statement line in the Checksum program where an error has actually been made. **Note that this feature works *only* on the Checksum program itself, and not on any other program listing in *RUN*.**

After you've entered and saved the Checksum program to disk, run it. If you've made any errors in any of the Data statements, the program will give you a specific line number. Find the mistake, correct it, press return, save the program and run it again. Repeat this procedure until the Checksum program runs flawlessly.

Control Characters Demystified

All the graphics and control characters in the listings in *RUN* have been translated into understandable key combinations. They are the instructions you see inside the curly braces. For example, {SHIFT L} means you hold down the shift key while you press the L key once. You do *not* type in the curly braces. What appears on the screen will look quite different from what is designated inside the braces. Here are some more examples:

{22 SPACES}—press the space bar 22 times.

{SHIFT CLR}—hold down the shift key and press the clr-home key once.

{2 CRSR DNs}—press the cursor-down key twice.

{CTRL 1}—hold down the control key and press the 1 key.

{COMD T}—hold down the Commodore logo key and press the T key.

{5 LB.s}—press the British pound key (£, *not* #) five times.

Refer to the following paragraphs for any other Error messages you get from running any program listing in *RUN*.

Other Error Messages

Having heard from many users over the years about their difficulties with typing in listings, we've identified a few recurring problems that plague many people but are easy to fix. So read on and see if your problem is one of these.

- You get an "Out of Data in Line xxx" message. This means that a program line was reading from Data statements and reached the end of the data before it was done reading. There are two possible problems.

One might be with the program line that reads the data, usually a For-Next loop. Make sure you have the proper values for the loop, because if, for example, the listing has a loop of 0 to 150, and you've typed 0 to 160, you'll get the Out of Data message. If the loop is correct, then the problem lies in the Data statements themselves. One possibility is that you omitted a whole line of data. That's easy enough to find and correct. It's more likely that you've skipped one or more individual data items or typed in a period instead of a comma, which causes two data values to be read as one number. Check your typing carefully against the listing. Using *RUN*'s Checksum program when you type in listings from the magazine should help in this case.

- You get an "Illegal Quantity Error in Line xxx" message. This means you've read a number from a Data statement and tried to poke it into a memory address. The error occurs because the number is larger than 255 (the largest value a memory address can contain), which means that somewhere in your Data statements you've made an error by typing in a number larger than 255. Again, this is easy to check for and correct. First look in your Data statements for a number larger than 255. You might have added an extra digit, or perhaps you ran two numbers together (23456 instead of 234,56).
- You get a "Syntax Error in Line xxx" message. This could be almost anything. What it tells you is that there is something wrong in the indicated line. Usually you've misspelled a Basic keyword or omitted some required character. List the line and examine it carefully.
- You get an "Error in Data" message. This occurs in programs that add up all the data as read, and, when finished, compares that sum with what it should be if the data were typed in correctly. If it isn't the same, it means an error somewhere in typing the Data statements. Go back and check the data carefully. Correct the mistake(s), save the new version and try again.
- Finally, we urge everyone who intends to type in one of our listings to use *RUN*'s Checksum program, which will help you avoid every mistake we've mentioned above, except that it won't detect the omission of a line. R

Listing. *RUN*'s Checksum program. This program is available on *RUN*'s BBS for users to download.

```
10 REM RUN'S CHECKSUM 64/128 - BOB KODADEK
20 MO=128:SA=3328:IF PEEK(40960)THEN MO=64:SA=49152
30 I=0:CK=0:CH=0:LN=190
40 FOR K=0 TO 16
50 FOR J=1 TO 10:READ B:IF B>255 THEN GOTO 170
60 CH=CH+B:POKE SA+I,B:I=I+1:NEXT
70 READ LC
80 IF LC<>CH THEN GOTO 170
90 CH=0:LN=LN+10
100 NEXT K
110 POKESA+110,240:POKESA+111,38:POKESA+140,234
120 PRINTCHR$(147)STR$(MO)" RUN CHECKSUM":PRINT
130 PRINT"TO TOGGLE ON OR OFF, SYS"SA:IF MO=128 THEN 1
    60
140 POKESA+13,124:POKESA+15,165:POKESA+25,124:POKESA+2
    6,165
150 POKESA+39,20:POKESA+41,21:POKESA+123,205:POKESA+12
    4,189
160 POKESA+4,INT(SA/256):SYS SA:NEW
170 PRINT"YOU HAVE A DATA ERROR IN LINE ";LN;"!":END
180 REM DO NOT CHANGE THESE DATA STATEMENTS!
190 DATA 120,162,24,160,13,173,4,3,201,24,884
200 DATA 208,4,162,13,160,67,142,4,3,140,903
210 DATA 5,3,88,96,32,13,67,152,72,169,697
220 DATA 0,141,0,255,133,176,133,180,166,22,1206
230 DATA 164,23,134,167,132,168,170,189,0,2,1149
240 DATA 240,58,201,48,144,7,201,58,176,3,1136
250 DATA 232,208,240,189,0,2,240,42,201,32,1386
260 DATA 208,4,164,180,240,31,201,34,208,6,1276
270 DATA 165,180,73,1,133,180,230,176,164,176,1478
280 DATA 165,167,24,125,0,2,133,167,165,168,1116
290 DATA 105,0,133,168,136,208,239,232,208,209,1638
300 DATA 169,42,32,210,255,165,167,69,168,170,1447
310 DATA 169,0,32,50,142,169,32,32,210,255,1091
320 DATA 32,210,255,169,13,32,210,255,104,168,1448
330 DATA 96,104,170,24,32,240,255,104,168,96,1289
340 DATA 56,32,240,255,138,72,152,72,24,162,1203
350 DATA 0,160,0,32,240,255,169,42,208,198,1304
```

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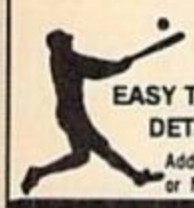

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Coming Attractions

128 Upgrade—
Attention, 128 owners: Soup up your computer with chip upgrades, including the 64K Video RAM upgrade. (This article was originally scheduled for May/June.)

Software Reviews—
Discover what's new in the world of software when we review the hottest packages on the market, including Back to the Future II; The Untouchables; and the latest in that popular role-playing adventure series, Ultima VI.

Travel Quiz—
Hey, ramblin' man, how well you know the road? We'll find out next issue with a type-in game program that quizzes your knowledge of street signs, landmarks and other rules of the road.

Books—
Many (MANY!) of the letters that come to *RUN* ask the question, "Can you recommend a good book on . . . ?" We'll provide answers to that difficult question next issue with the C-64/128 Book Buyer's Guide, which reviews some of the most informative, useful books in the Commodore market.

Plus—
More reviews; a desktop publishing update; programming, computing and gaming tips; columns on GEOS, the C-128, news and new products; and more!

ReRUN Preview—
Here's the May/June lineup: **BookDisk**—Use your C-64 to publish a book. **Profiler 64**—Make your Basic programs more efficient. **Bomb Squad**—Collect the keys and disarm the bomb before it explodes. **Scaling Metric**—Convert to metric on the 64 and 128. **Missile**—See how defensive systems intercept incoming missiles. **Scoreboard**—Use your C-64 to keep track of game scores. **Video Phile 128**—Organize your video tapes with the 128. **Wild Eights**—Match wits with the C-128 in this fun card game.

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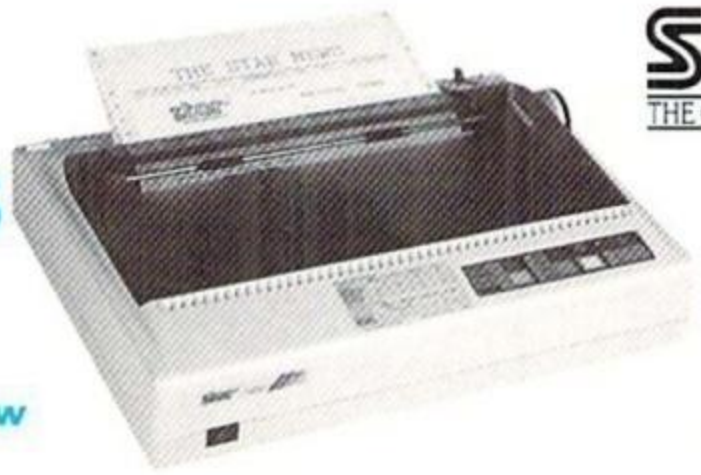

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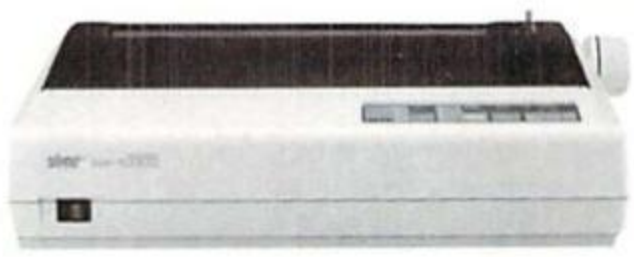

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